NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 4, NUMBER 19 MAY 11, 1987

▶ *INTERNATIONAL CARRIERS*

# ITT sells WORLDCOM

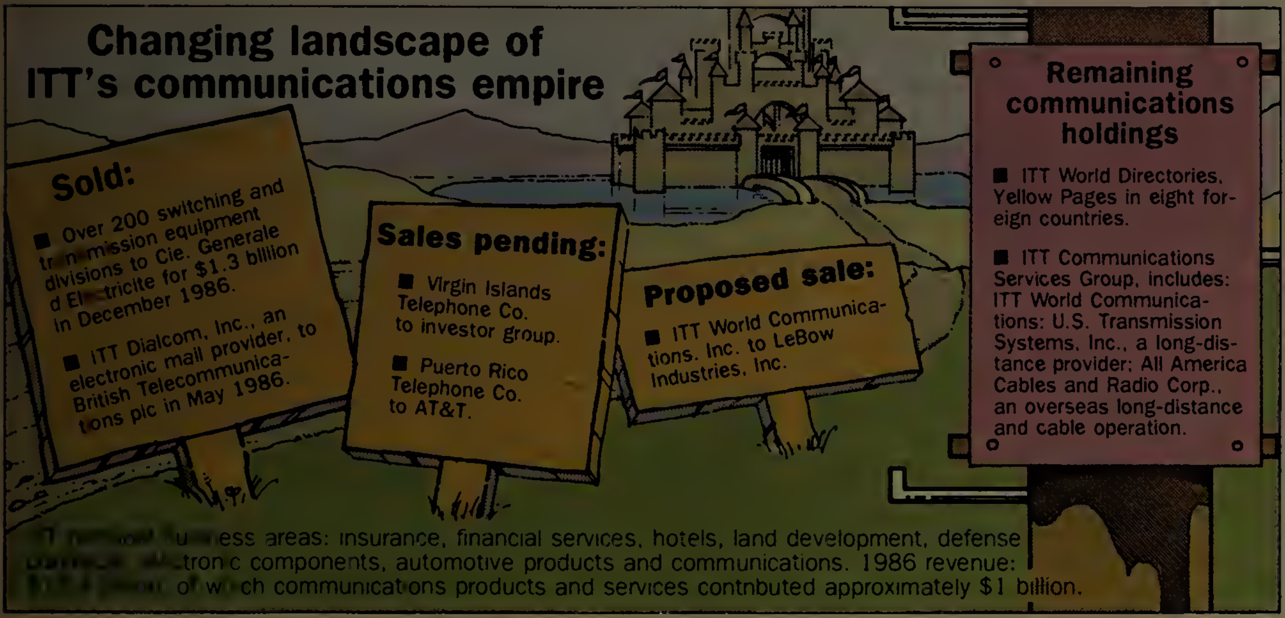
**BY PAM POWERS**
Senior Editor

NEW YORK — ITT Corp. said last week it will sell its ailing World Communications, Inc. (WORLDCOM) subsidiary to a private investor here who plans to merge the division with debt-ridden Western Union Corp., in hopes of creating a powerful new networking services company.

Investor Bennett S. LeBow, chairman of LeBow Industries, Inc., has agreed to pay $170 million for WORLDCOM, the ITT division that supplies telex, public packet-switching and data transfer services. LeBow also plans to acquire a controlling interest in Western Union after that company completes a previously announced reorganization. WORLDCOM will be merged with Western Union to create what LeBow called a "leading carrier for the exchange and distribution of electronic messages worldwide."

The sale of WORLDCOM, one of ITT's few remaining communications subsidiaries, is the latest step in the company's efforts to trim its communications holdings.

See **ITT** page 40


Changing landscape of ITT's communications empire
Sold:
■ Over 200 switching and transmission equipment divisions to Cie. Generale d Electricite for $1.3 billion in December 1986.
■ ITT Dialcom, Inc., an electronic mail provider, to British Telecommunications plc in May 1986.
Sales pending:
■ Virgin Islands Telephone Co. to investor group.
■ Puerto Rico Telephone Co. to AT&T.
Proposed sale:
■ ITT World Communications, Inc. to LeBow Industries, Inc.
Remaining communications holdings
■ ITT World Directories, Yellow Pages in eight foreign countries.
■ ITT Communications Services Group, includes: ITT World Communications: U.S. Transmission Systems, Inc., a long-distance provider; All America Cables and Radio Corp., an overseas long-distance and cable operation.
ITT [illegible] business areas: insurance, financial services, hotels, land development, defense [illegible] electronic components, automotive products and communications. 1986 revenue: [illegible] of which communications products and services contributed approximately $1 billion.

▶ *SATELLITE INDUSTRY*

# AT&T, Equatorial suffer VSAT woes

*User wariness mires market.*

**BY BOB WALLACE**
Senior Editor

Overestimated customer demand for very small aperture terminal satellite networks, coupled with long sales cycles and a misguided perception of user needs, has spelled trouble for both AT&T and Equatorial Communications Co., two of the industry's primary providers of VSAT networks.

See **VSAT** page 39

▶ *INTECOM*

# 'Open' IBX bows

**BY JIM BROWN**
New Products Editor

ALLEN, Texas — Intecom, Inc. is expected next week to announce an Open Application Interface designed to merge the functions and features of its Integrated Business Exchange private branch exchange with computer and voice processor applications.

The announcement, which John Thibault, president of the Wang Laboratories, Inc.-owned company, detailed in a recent interview with *Network World* ("Wang bullish on Intecom," *NW*, April 27), is expected to be made at the In-

See **Open** page 8

## NETWORK LINE

### News

▶ Next week's 40th annual ICA show promises users a look at innovation in networking. Page 2.

▶ 3Com and Apple build an adapter that lets Macintoshes tie into Ethernet. Page 2.

▶ A New York firm wins a precedent-setting rate ruling involving N.Y. Tel's investment recovery charges. Page 2.

▶ COMSAT concedes its merger with Contel is off, despite an FCC decision to rethink the $62 million refund order that soured Contel on the deal. Page 2.

▶ Users at IDC's Spring Executive Conference say they're going ahead with networking plans, despite a lack of integrated net control tools. Page 4.

▶ A top IBM executive outlines SNA and net management product directions and Rolm's plans to support ISDN. Page 4.

### Features

▶ For providing emulation and file transfer from micro to host, protocol converters stand out from the pack, but peer-to-peer links are gaining ground. Page 35.

NEWSPAPER

▶ *MANAGEMENT*

# Ex-GIs trade M-1s for T-1s

*Tough training, contacts pay off for veterans.*

**BY MICHAEL FAHEY**
Staff Writer

When asked how his job as a corporate communications manager differs from his work in communications operations with the U.S. Navy, Chuck DeCicco said, "Today, if my boss came in and ordered me to do some push-ups, I'd deck him."

There are aspects of Navy life that DeCicco, now manager of communications for engineering firm Bechtel, Inc. in Houston, does not miss. But he and other communications managers who have made the transition from the military to the business world believe the field experience the services offered was invaluable.

See **Ex-GIs** page 39

FEATURE FOCUS

# Meganets mesh industries, build competitive advantages

**BY JULIA KING**
Special to Network World

As computer networking expanded through corporate America, industry analysts were quick to predict the coming of the "paperless office," where in and out baskets and paper documents would go the way of the $2 haircut. While paper is not yet passe, more companies are relying on networks to handle the bulk of their internal communications.

However, only a few users have constructed "meganets," or intercompany networks that extend beyond their corporate boundaries. For these users, the goal is no longer simply to reduce or

☞ Continued on **page 30**

*INTERNATIONAL COMMUNICATIONS ASSOCIATION SHOW*

# Innovative users focus of 40th ICA exhibition

**BY JOSH GONZE**
Staff Writer

NEW ORLEANS — Users interested in network optimization and cost-busting innovation can benefit from a wealth of user-oriented sessions scheduled for the 40th annual Conference and Exhibition of the International Communications Association (ICA), which gets under way here next week.

A cornerstone session, dubbed "Call for Innovation" and slated for Wednesday, will showcase original ways three ICA members have applied telecommunications technology to improve business operations. Speakers will discuss the innovative techniques they have employed to enhance the bottom line or improve services, according to top ICA officials. The conference will be held at the New Orleans Hilton and New Orleans Convention Center.

Representatives of First Wisconsin National Bank of Milwaukee will explain how, in only 18 months, the company designed and implemented a 300-location, voice and data wide-area network.

Ryan James, of United Technologies Corp., will describe the process of blending virtual networks from two carriers to optimize an existing electronic tandem network and cut overall communications costs by 30%. Harry Lafoe Jr. plans to reveal how Marathon Oil Co. used alternative foreign exchange service to lower the cost of a three-line trunk group by 69%.

See **Innovative** page 42

*INVESTMENT RECOVERY CHARGES*

# NY user wins key CPE rate ruling

**BY JOSH GONZE**
Staff Writer

ALBANY, N.Y. — Cushman & Wakefield, Inc. recently outmaneuvered New York Telephone Co. in a precedent-setting rate ruling that other state users could employ to avoid up to $140 million in annual equipment lease charges.

On March 18, the New York Public Service Commission (PSC) ordered the Bell operating company to stop assessing Cushman & Wakefield an investment recovery charge (IRC) originally designed to help some BOCs recover revenue lost when all embedded equipment was turned over to AT&T at divestiture.

New York Telephone is one of the few BOCs still using the charge, which applies to all telephone equipment leased to customers by the BOC prior to divestiture. Subscribers that have since bought the leased equipment no longer have to pay the charge after informing New York Telephone of the purchase.

Cushman & Wakefield managed to sidestep the charge by getting AT&T, the holder of its lease, to sell the equipment to a third party, which then leased the equipment back to the real estate firm. The maneuver will save the company more than $100,000 over an eight-

See **NY** page 6

*DEATH OF A MERGER*

# COMSAT: The deal's off

**BY KARYL SCOTT**
Washington, D.C. Correspondent

WASHINGTON, D.C. — Communications Satellite Corp. officials acknowledged last week they are ready to call off the company's proposed $2.5 billion merger with Atlanta-based Contel Corp. in the wake of Contel President John Lemasters' resignation. Lemasters, one of the prime architects of the merger, announced his resignation two weeks ago.

According to a source within COMSAT, officials of the two companies have been meeting to work out terms of a cash settlement to be paid to COMSAT for its consent to the merger cancellation. The source asked not to be identified.

Richard McGraw, vice-president of corporate affairs with COMSAT, would not comment on the possibility of such a settlement but said the merger is unlikely to take place. "I think it's fair to say the deal is off," McGraw said. "It's now a matter of shedding ourselves of the Contel merger fallout and getting our house back in order."

Analysts said COMSAT has decided not to risk a protracted legal battle with Contel over the dashed merger and is hoping to resolve its recent problems with the Federal Communications Commission. COMSAT apparently acquiesced to the merger cancellation, despite the FCC's decision last week to reconsider its order requiring COMSAT to refund $62 million to its customers. The FCC also said it would not investigate COMSAT's earnings from 1978 to 1982, as was

See **COMSAT** page 40

*Network World* wants to make its news coverage better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Bruce Hoard toll free at (800) 343-6474.

## Table of contents

**TOP NEWS**

Novell and Micom are working on TCP/IP support for NetWare, easing Novell/DEC integration. **Page 5.**

PacBell asks the FCC to reconsider a recent ruling affecting its Project Victoria service. **Page 6.**

**INDUSTRY UPDATE**

TIE/Communications fights to keep its No. 2 position in the crowded key systems market. **Page 9.**

**TELECOM TRENDS**

Hotel heavyweight Marriott Corp. builds a 15,000-line net using Northern Telecom equipment. **Page 11.**

**DATA DELIVERY/ NET MANAGEMENT**

Without a hitch and in one weekend, Com/Energy changes its corporate headquarters — and its communications system. **Page 15.**

**LOCAL NETWORKING**

Terminal-to-host net vendors feel the squeeze as users switch to PC networks. **Page 19.**

**COMMUNICATIONS MANAGER**

There's no rhyme or reason to planning application strategies, say communications managers. **Page 21.**

**NEW PRODUCTS AND SERVICES**

Vitalink enhances its TransLAN bridge for Ethernet LANs with a T-1 interface and new software. **Page 25.**

**FEATURES** **Page 30.**

**CALENDAR** **Page 42.**

*LOCAL NETS*

# 3Com ties Mac into Ethernet

### *Develops adapter jointly with Apple.*

**BY PAULA MUSICH**
Senior Editor

SANTA CLARA, Calif. — 3Com Corp. announced last week it is working with Apple Computer, Inc. to develop a 10M bit/sec Ethernet adapter for the Macintosh II.

Development of the EtherTalk adapter, first disclosed during the AppleWorld conference in late February ("Apple debuts two 'open' Macintoshes," *NW*, March 2), will enable customers to integrate the Macintosh II into Ethernet environments.

"The EtherTalk card is a way for us to provide a higher speed AppleTalk," said Gursharan Sidhu, manager of engineering for networks at Apple. AppleTalk is a low-speed, proprietary Apple local network. "We can run the entire AppleTalk suite of protocols on Ethernet cabling, and everything looks the same to the user," Sidhu said. "It goes a whole lot faster."

Another advantage provided by Ethernet support is the ability to operate over existing Ethernet cabling plants, which are prevalent in the areas Apple is targeting for the new Macintosh, Sidhu said.

Apple also plans to support the Transmission Control Protocol/Internet Protocol over the Ethernet adapter. TCP/IP hooks will be written into Apple's version of Unix for the Macintosh II, dubbed A/UX. Apple expects that initial sales of the Macintosh II, which began shipping last week, will be to users in higher education as well as scientific and engineering areas, where Unix, Ethernet and TCP/IP are widely used.

3Com plans to support EtherTalk with its 3System networks, the heart of which is the 3Server and its 3+ software. This will allow Macintosh IIs and IBM Personal Computers and compatibles to share servers, files and other network resources. "The server software and network functionality will be the same between the Macintosh II and the PC," said Wes Raffel, 3Com's director of marketing in the hardware products divi-

See **3Com** page 42

Correction: It was reported in "AT&T accused of fraud," *(NW,* March 2*)* that Merrill Lynch & Co., Inc. claimed it had no relationship with Worldwide 800 Services, Inc. According to invoices supplied by Worldwide, Merrill Lynch offices in Singapore, Hong Kong and several other foreign cities do have relationships with the firm.

Only One
Manufacturer
of T-1
Resource
Managers…

Has more than 6,000 units installed worldwide.

Provides worldwide factory service.

Can design, install, and maintain
your entire network.

Can save you substantially more
money than any other supplier.

Has systems compatible with
all worldwide standards.

Timeplex®

Timeplex, Inc. Woodcliff Lake, NJ 07675 201-930-4600

*IDC SPRING EXECUTIVE CONFERENCE*

# Net control tools few

## *But users carry on with network plans.*

**BY MICHAEL FAHEY**
Staff Writer

AMELIA ISLAND, Fla. — The lack of integrated network management tools is not keeping users from undertaking major networking projects, according to attendees at International Data Corp.'s (IDC) 1987 Spring Executive Conference held here last week.

That network management is a concern shared by users was illustrated by the results of an IDC-sponsored survey conducted among conference attendees. The nearly 100 users surveyed agreed that improving network management is a top priority and that the ability to manage equipment from multiple vendors is critical. Users also agreed that modem vendors will not be able to meet their future needs for network management capabilities.

On the average, the users surveyed said they use equipment from nearly 20 different vendors in their information processing and communications systems. The companies represented by the respondents had an average of 68 sites, 30 of them international sites.

Users interviewed by *Network World* at the conference agreed that comprehensive, integrated net management tools are not yet available. Despite that, users said they are going forward with plans to upgrade existing communications facilities or build new nets.

Robert Miyashiro, deputy assistant director for telecommunications at the U.S. Department of Justice, said his organization is implementing a nationwide private network in an effort to cut communications costs.

The department's net, when completed, will link some 20,000 terminals at 500 sites throughout the country. It is expected to pare telecommunications costs by some $180 million over the first seven years the network is operational, Miyashiro said. The agency is currently issuing requests for proposal for equipment and services to be used in the project, he added.

"The government's goal is to cut costs," Miyashiro said. "The demise of Telpac made us really think about costs." Telpac is a discount bulk calling service no longer offered by AT&T.

Miyashiro said he is confident that vendors are at work developing comprehensive network management tools, but they are not available today. He also questions whether the solution to his network management problems will be found in one powerful, integrated tool. Instead, Miyashiro said he

See **Net** page 8

*FUTURE DIRECTIONS*

# IBM exec divulges product plans

**BY JOHN GALLANT**
Managing Editor

AMELIA ISLAND, Fla. — A top IBM executive last week outlined future Systems Network Architecture and network management product directions and talked about subsidiary Rolm Corp.'s plans for adding Integrated Services Digital Network interfaces to its CBX private branch exchange.

Speaking at International Data Corp.'s (IDC) 1987 Spring Executive Conference here, Lark Allen did not comment on specific products to be announced by IBM, but he described the company's evolving communications strategy and the key product development objectives called for in that strategy. Allen is manager of telecommunications marketing programs for IBM in Raleigh, N.C.

In illustrating IBM's strategy, Allen referred to what he jokingly called IBM's "telecommunications iron cross," a diagram showing the four key objectives of the net blueprint ("IBM weaving voice, OSI into SNA fabric," *NW*, Nov. 3). The objectives include providing tools for bandwidth management, data and voice connectivity, and transformation mechanisms.

Transformation mechanisms are products to help users move over time from older systems, such as analog equipment or nonstandard computing machinery, to new technologies, including digital systems and products based on IBM or international standards.

The thread that weaves the four major components together is network management. Allen said IBM will provide both centralized and distributed network management products to put control of networks in the hands of users.

"In the 1970s, we had 53 perfect solutions for telecommunications," Allen observed. "Different managers within IBM had different approaches, and that posed a challenge for customers. That was why we formulated the Systems Network Architecture, to help us and our customers make better use of resources.

"IBM has a fundamentally different strategy today," Allen continued. "Network management is a key aspect of SNA. It has become a major buying factor and a big part of our strategy. The objective is to give customers end-to-end control of the network."

Allen said SNA products will be enhanced to support what he called 24-hour continuous operation, meaning users will be able to dynamically reconfigure and control SNA networks without taking network components off-line.

Allen told users at the IDC briefing that IBM intends to bring full SNA functionality to computers at every level of its processor line. "The challenge," he said, "is to be able to build SNA networks without 370-type systems in them." Realization of that goal will involve wider deployment of a peer-to-peer architecture within SNA, Allen said.

### Enhanced CBX capabilities

He went on to say IBM is working to improve the network management and control capabilities of Rolm's CBX. He said the switch will be enhanced to support ISDN's basic rate (2B+D) and primary rate (23B+D) interfaces, and he added that IBM will provide what he called an "advanced host-to-CBX application interface" to support emerging integrated voice/data applications.

Also in the area of network management, Allen said IBM will provide distributed control tools that help users manage portions — including local networks and departmental systems — of so-called enterprise networks, large corporate nets linking users and applications on a variety of machines. But a major focus of IBM's efforts will be host-based net management tools.

"IBM is not trying to lock you into the host," Allen said. "We want to help you put processing power and applications wherever necessary. But some things are natural for central-site control, such as network management."

Allen said SNA will serve as a base for "a standard approach to net management." By standard, IBM means that it will continue to publish SNA architectures and information on such products as NetView and NetView/PC so other vendors can integrate their products into the IBM tapestry. Allen said more than 80 vendors have already participated in IBM training on integration with NetView/PC.

Allen said IBM's goal is to "convince the world there is no one more open than IBM."

"Open, to IBM, means helping people work within SNA," Allen said. Along those lines, IBM will continue to expand what he referred to as SNA's advanced function architectures and will publish those architectures for others to work with.

But Allen said IBM will support international standards development and will implement those standards where its customers need them. "We will not just provide a gateway between SNA and [Open Systems Interconnect]," Allen said. "Where customers want to use international standards, we will implement them in our products." ☑

NETWORK WORLD
**Box 9171, 375 Cochituate Road**
**Framingham, Mass. 01701-9171**
**617/879-0700**
**Editor**
Bruce Hoard
**Managing Editor**
John Gallant
**Features Editor**
Steve Moore
**Assistant Managing Editor — News**
John Dix
**Assistant Managing Editor — Production**
Lisa Guisbond
**Senior Editors**
Bob Hamel
Paul Korzeniowski
Paula Musich
Pamela T. Powers
Bob Wallace
**Staff Writers**
Michael Fahey
Josh Gonze
**New Products Editor**
Jim Brown
**Washington, D.C. Correspondent**
Karyl Scott
1273 National Press Building
529 14th Street NW
Washington, D.C. 20045
**West Coast Correspondent**
Mary Petrosky
501 Second Street
Suite 600
San Francisco, CA 94107
**Assistant Features Editors**
Bruce Guptill
Robert Mitchell
**Associate Editors**
Peter Hoffmann
Beth Lazarus
**Copy Editors**
Joanne McQuaid
Anne Ryder
**Art Director**
Dianne Barrett
**Informational Graphics Designer**
Alan Hopkins
**Assistant to the Editor**
Cheryl Tynan

**Publisher**
F. Douglas DeCarlo
**Administrative Manager**
Mary Fanning

**Board Chairman**
Patrick J. McGovern

**Chief Executive Officer**
**CWCI, Inc.**
Axel Leblois

**President CWCI-Framingham**
Lee Vidmer

**Vice President-Research**
Jack Edmonston

Second-class postage paid at Framingham, MA, and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue the last two weeks in December by CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-800-544-3712, within Pennsylvania 1-215-630-9500.

Non-qualified subscribers: $3.00 a copy; U.S. — $95 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

*Network World* can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

*Network World* is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS:. Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

POSTMASTER: Send Change of Address to *Network World*, Box 1021, Southeastern, Pa. 19398-9979.

*Copyright 1987 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in* Network World *is forbidden without written permission.*

ABC ABP

*Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.*

▶ *LOCAL NETWORKS*

# Novell backing TCP/IP

**BY MARY PETROSKY**
West Coast Correspondent

PROVO, Utah — Novell, Inc. is working with Micom-Interlan, Inc. to develop TCP/IP support for Release 2.1 of NetWare, a step that may facilitate the integration of Novell equipment with Digital Equipment Corp. environments, *Network World* has learned.

Support for the Department of Defense's Transmission Control Protocol/Internet Protocol will be available as an option to NetWare in a package called TCP Option, according to Mark Calkins, director of corporate marketing for Novell.

TCP Option will run on the network file server and act as a gateway to other TCP/IP environments. The protocol, used heavily in military, scientific, education and other markets, will enable Novell to interconnect with a wide range of computers and network types, Calkins said.

Novell is developing the option in conjunction with Boxborough, Mass.-based Micom-Interlan, which will provide a front-end protocol processor for NetWare servers, according to Dave Williams, director of market development and planning for Micom-Interlan.

The board-level product is designed to do some of the processing of the TCP/IP protocols and contains an Ethernet interface, Williams said. Customers will be able to use the board in an 80286 or 80386-based personal computer acting as a file server, or in a Novell file server, Williams said.

TCP Option will allow users "to log onto a remote VAX or Unix machine and behave as a terminal using Telnet, or log on and transfer files using the File Transfer Protocol," Williams said.

Release 2.1 of NetWare, scheduled for shipment this summer, incorporates a new protocol set, Sequence Packet Exchange (SPX), which will be used to move data around the local network, according to Mike Paluzzi, sales support manager for Novell's west area. NetWare will handle the conversion from the SPX protocols to TCP/IP and back again, Paluzzi said.

Demand for TCP Option is strongest among Novell's major accounts, Calkins explained. Regardless of size, however, Paluzzi believes TCP Option will appeal to users because it will allow Novell to integrate into the DEC environment.

Although DEC offers a DECnet-to-TCP/IP gateway that runs with its Ultrix operating system, John Adams, group engineering manager for DEC's local-area network group, is not sure the protocol implementations would mesh. "The question is, does the other vendor's TCP/IP work with our TCP/IP," Adams said. "The basic problem with TCP/IP is the standards are not that tight," he added.

Although he agrees there are a lot of users looking to connect personal computer-based local networks to DEC equipment, Dennis Passovoy, executive vice-president of DataLAN, Inc., a local network reseller in Canoga Park, Calif., questions Novell's decision to support TCP/IP rather than DECnet DOS. DECnet DOS is applications-level networking software developed by DEC to link IBM Personal Computer-compatible personal computers and its own VAX Mate to DECnet.

"There are a lot of people out there running DECnet that the TCP Option won't address," Passovoy said. He noted that Virtual Microsystems, Inc. (VMI), which already supports a variety of local network connections to DEC VAXes, is working on a way to make Novell's NetWare and DECnet DOS coexist.

With a product called the Network Co-processor, VMI currently supports a physical connection between various local networks and VAXes. In addition, software provides support for network operating systems based on Microsoft Corp.'s MS-Networks, as well as support for DECnet protocols and DECnet DOS, said Gianluca Rattazzi, VMI's chief operating officer.

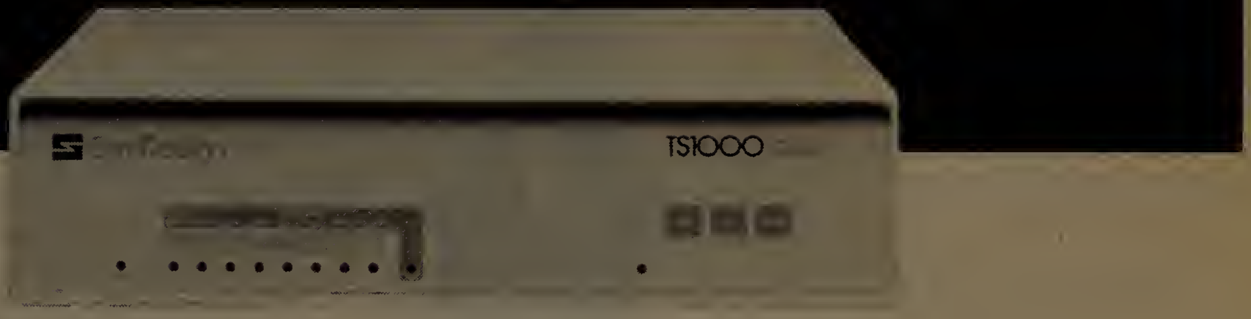
By mapping DOS file formats to VMS file formats, the Network Co-processor allows files on a VAX to look like MS-DOS files to personal computer users and like VMS files to both personal computer and VAX users operating in VMS mode.

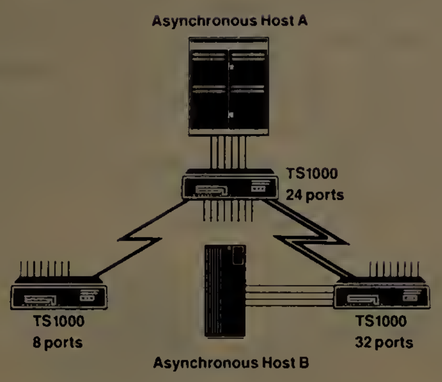
Since Novell's NetWare uses a proprietary file format, it is not yet supported on the Network Co-processor. Rattazzi said, however, that VMI is working with Novell to develop an appropriate mapping between Novell's file format and the VMS format.

DEC does not yet offer any solution for linking personal computer-based local networks into DECnet aside from TCP/IP, Adams said.

However, users can physically link individual nodes on a local net to DECnet by using an Ethernet network adapter from either Micom-Interlan or 3Com Corp. ◪

How a smart mux
can make *you* look smart.





The TS1000 Switching Multiplexer gives you everything you're looking for in a mux: Exceptional cost savings. Link speeds as fast as 64K bps. Channel speeds up to 19.2K bps. Port contention. Multiple links for throughput and redundancy. And exceptional ease of operation thanks to centralized network control functions.

You're also assured a simplified, economical upgrade path based on our building-block strategy.

**You'll find that one of the two TS1000 versions can perfectly match your specific requirements.**

The TS1000 *single link* version functions as a conventional switching stat mux in point-to-point configurations, supporting 4 to 32 channels and a single composite link. It can also serve as a low-cost end node in larger private data networks.

The *quad-link version* supports 8 to 32 channels and four composite links. Each TS1000 link may connect to one of four different sites, or multiple links may connect to a single site for greater data throughput and added backup.

Simply put, ComDesign's TS1000 is designed to help you invest smart. Work smart. And look smart.

**But what makes you look absolutely brilliant are the TS1000's exceptional reliability and unique migration features.**

The TS1000 ensures end-to-end integrity with error correction and automatic rerouting in the event of line failure.

To further maximize uptime, we offer you a full year warranty that guarantees overnight unit replacement with free parts and labor. We also provide optional on-site service for larger networks.

Compatibility with the full range of FutureCom™ family networking products assures a flexible upgrade path from a simple point-to-point mux to a network with hundreds of user connections.

Because of its modular design, TS1000 software and channel capacity upgrades are exceptionally simple and economical. In fact, all ComDesign products offer a migration path that lets you build on your original investment.

Like to know more?

It's all in this
free brochure.

For a free copy of our brochure,
call 1-800-232-5599
(in CA, 1-800-227-5445).
Ask for Dept. MX.

ComDesign
A Network Equipment Technologies Company
751 South Kellogg Ave., Santa Barbara, CA 93117

Trademark: FutureCom—ComDesign

# Washington update

**BY KARYL SCOTT**
Washington, D.C. Correspondent

Pacific Bell filed a request last week with the FCC asking it to reconsider a decision that would require the company to market end-user equipment for its proposed Victoria service through a separate subsidiary.

The Federal Communications Commission ruled that the multiplexer Pacific Bell intended to use with its Integrated Services Digital Network-like Victoria service is actually customer premises equipment. Stipulations of the Modified Final Judgment require the regional Bell holding companies to market customer premises equipment through separate subsidiaries.

Despite statements last month that it would go ahead with a commercial trial of Project Victoria, regardless of the FCC ruling, Pacific Bell has now decided to postpone its market test ("FCC rule won't halt trial," *NW*, April 6).

"By requiring a separate distribution effort for the remote unit, the ruling unnecessarily inhibits our ability to efficiently provide our customers' network services," said Michael Eastwood, Pacific Bell executive director for new network applications.

The FCC last week gave Nynex Corp. and Pacific Bell permission to offer switched 56K bit/sec access service that will allow the two companies to provide 56K bit/sec digital data circuits within their operating regions for the first time. Business customers will also be able to transmit data from their business locations to interexchange carriers' similar high-speed services.

This new option is designed to provide low- and moderate-volume customers with a more cost-effec-

See **Update** page 8

The Art Of Showing Off With A Wall Protocol Converter

*Making anything talk to anything else. PCs, mainframes and System 3Xs. Macintoshes. And more!*

When was the last time you really heard a gasp of surprise? It's getting tougher to show off these days. Everybody's computer literate; nobody admits to being impressed. So let a Wall Data Protocol Converter bring the magic back into your job. Be a star. Put on one or more of the following performances.

**"YOU CONNECTED ALL THOSE PCs, TERMINALS AND EVEN MACINTOSHES TO OUR MAINFRAME?"**

How do you let *the rest of us* talk to your mainframe? With the DCF II™ unit, any mix of PCs, terminals, workstations, printers or even Macintoshes (with full mouse support) can become 3270 devices to your mainframe.

And if one of your DCF II ports is connected to a modem, you can dial into the system from home. So after you get the kids to bed you can log onto the electronic mail system and thank your boss for the promotion.

**"ALL RIGHT! HOW DID YOU GET THE WHOLE DEPARTMENT ONLINE THROUGH JUST ONE 3270 HOST PORT?"**

This one was really easy. With Wall Data's Communications Port Expander (CPX™) unit, a single port on your mainframe's front-end can now support up to eight 3270 controllers or PCs with SDLC cards. Which opens such possibilities as . . .

**"THE LEASED LINES WERE DOWN, YET YOU WERE STILL ONLINE! HOW?"**

Easy. One or more of the CPX expansion ports we just showed off could have been connected to a synchronous modem. For a rainy day.

**"YOU MEAN WE CAN USE THE SAME WALL PROTOCOL CONVERTER ON BOTH MAINFRAMES AND SYSTEM 3Xs?"**

Surprise! Everything we said about connecting CPXs and DCF IIs to mainframes applies to the System 3X. That's because they're "software configurable" to become 5251s just as painlessly and easily as they became 3270s. In fact, they even have spare ports reserved for remote diagnostics and troubleshooting. And downloading of the latest software revisions. Once you power up your Wall Data Protocol Converter, you might as well forget where you put it. Because you'll never have to touch it again. (By the way, if you're a VAR reseller, this is a dream come true). Troubleshooting, monitoring and some of the really slick stuff we haven't already talked about can be done from your terminal. Not on your hands and knees in that dusty old utility closet. What really slick stuff haven't we talked about, you ask?

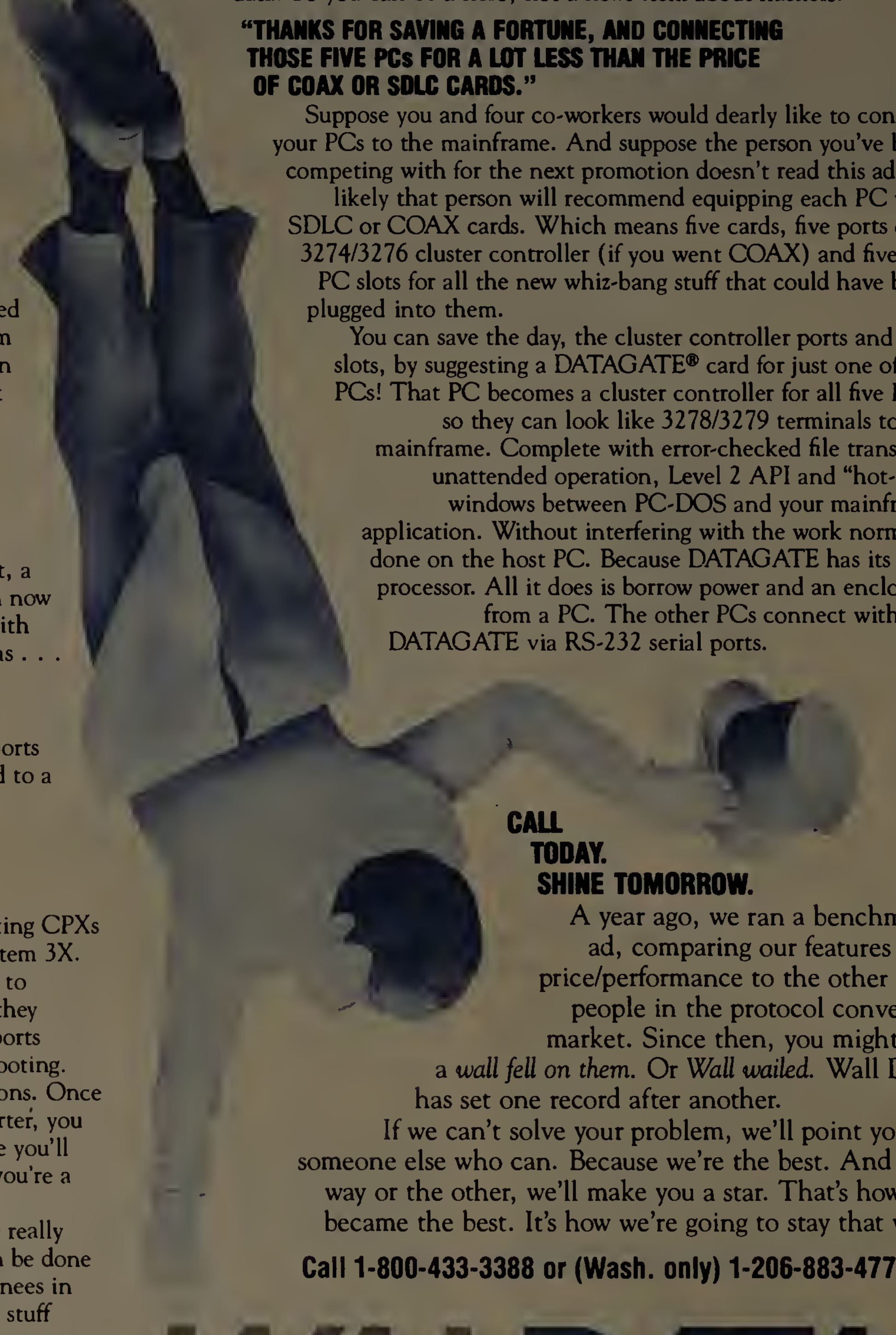
**"HEY, BOSS! DO YOU MIND IF I START MY OWN KGB?"**

Because the Wall Data Protocol Converters are the smartest on the planet (perhaps even the Galaxy), they have features too numerous to mention in one ad. Features like dial-back security with audit trails and reports. So when a remote caller dials in, the Wall unit takes the user's name, hangs up, checks the outside phone number from which that user is authorized to call, and then calls that number back and connects the user to the system. Just like the KGB would do it. Or the CIA. Or any company that cares about the security of its data. So you can be a hero, not a news item about hackers.

**"THANKS FOR SAVING A FORTUNE, AND CONNECTING THOSE FIVE PCs FOR A LOT LESS THAN THE PRICE OF COAX OR SDLC CARDS."**

Suppose you and four co-workers would dearly like to connect your PCs to the mainframe. And suppose the person you've been competing with for the next promotion doesn't read this ad. It's likely that person will recommend equipping each PC with SDLC or COAX cards. Which means five cards, five ports on a 3274/3276 cluster controller (if you went COAX) and five less PC slots for all the new whiz-bang stuff that could have been plugged into them.

You can save the day, the cluster controller ports and four slots, by suggesting a DATAGATE® card for just one of the PCs! That PC becomes a cluster controller for all five PCs, so they can look like 3278/3279 terminals to the mainframe. Complete with error-checked file transfers, unattended operation, Level 2 API and "hot-key" windows between PC-DOS and your mainframe application. Without interfering with the work normally done on the host PC. Because DATAGATE has its own processor. All it does is borrow power and an enclosure from a PC. The other PCs connect with the DATAGATE via RS-232 serial ports.



**CALL TODAY. SHINE TOMORROW.**

A year ago, we ran a benchmark ad, comparing our features and price/performance to the other four people in the protocol converter market. Since then, you might say a *wall fell on them*. Or *Wall wailed.* Wall Data has set one record after another.

If we can't solve your problem, we'll point you to someone else who can. Because we're the best. And one way or the other, we'll make you a star. That's how we became the best. It's how we're going to stay that way.

**Call 1-800-433-3388 or (Wash. only) 1-206-883-4777**

WALLDATA

**Wall Data Incorporated • 17769 Northeast 78th Place**
**Redmond, Washington 98052-4992 • Telex 265211**

Copyright © 1987 by Wall Data Inc. CPX,™ DATAGATE® and DCF II™ Wall Data. The other companies mentioned own numerous registered trademarks. TRBA

# NY user wins rate ruling

continued from page 2

year period.

New York Telephone argued that since a third party purchased the equipment, the charge should still apply. The New York PSC not only disagreed with New York Telephone but ordered it to refund the company about $30,000 in charges levied since the transaction transpired in December 1984. The real estate company would have had to pay $70,000 worth of recovery charges through 1991.

Cushman & Wakefield would not comment on the case. New York Telephone expressed disappointment in the ruling and said it had not yet decided whether it will appeal the ruling.

Other New York Telephone customers still using AT&T Dimension private branch exchanges and Horizon key systems leased from the BOC before divestiture must pay the IRC until Nov. 4, 1991.

The size of the IRC was originally set at 47% of the rental rate just prior to divestiture. Carl Johnson, a communications rates analyst with the Tariff and Rates Division at the New York PSC, said that the IRC was originally anticipated to provide New York Telephone with about $320 million annually. He said 50% to 60% of the equipment tied to IRC payments has been sold to subscribers, and he estimated the current annual value of IRC payments to the BOC at about $140 million.

> "There are quite a few customers in New York that still have Dimensions and Horizons and don't know what an IRC is."

According to Kevin Sweeney, senior consultant with the New York-based telecommunications consulting firm M & SD Corp., it is likely other New York companies that have purchased existing telephone gear from AT&T still pay IRCs every month because they are unaware of the requirement that they must inform New York Telephone of the change.

"I'm confident that there are quite a few customers in New York that still have Dimensions and Horizons and don't know what an Investment Recovery Charge is," he said.

The New York PSC's Johnson agreed that there may be New York Telephone subscribers paying the IRC charge unnecessarily, and he guessed that such subscribers are mostly smaller businesses and residences.

Johnson also agreed the case sets a refund precedent for other New York firms that failed to notify New York Telephone of when they have purchased embedded terminal equipment from AT&T. "It would certainly buttress their case if they were seeking credit for past IRC payments from the time that they purchased the equipment," Johnson said. ☑

Another in a series of CLEO user applications

# "Thanks to CLEO, we were the first company accepted by the IRS for electronic transfer of tax returns."

CLEO makes the MAINFRAME connection
CLEO data communications products since 1976
CLEO

CLEO has been providing solutions to remote sites communication problems for years. Here is a typical example:

> **"...We expect reasonable vendor service, of course. But in this case, we were under a rapidly approaching IRS deadline, and we needed assistance 'yesterday'. To make matters worse, the problem occurred over the Christmas period."**
>
> **"...With two CLEO Syncmodem 208 devices and CLEO 3780Plus software, we got the job done. To date, we have processed over 4,100 returns to the IRS."**
>
> **"...The performance of the CLEO modems and software has been flawless."**
>
> **"...I can honestly say that we would not have been the first company accepted by the IRS for electronic transfer of tax returns had it not been for the prompt, patient and knowledgeable assistance of CLEO."**

John T. Hewitt, General Manager
Mel Jackson, Inc.
Virginia Beach, VA

## Remote Sites Communication

Whatever your industry, your remote computers need to share information with your mainframe. Or, they need to exchange data with other remotes. In either case, you need a total solution at the remote sites. You need software, hardware interfaces and modems that all work together smoothly. You need CLEO!

CLEO software products allow microcomputers to communicate with minicomputers and mainframes, and to emulate their workstations. Since 1981, CLEO has provided remote communications between micros and mainframes for the automotive, insurance, medical and banking industries. Today over 44,000 CLEO users worldwide are running on all major brands of microprocessors. The greatest number of these users run CLEO software on IBM Personal Computers and NETBIOS LANs.

## Complete Software/Hardware Package

Every CLEO package contains all the software and hardware accessories needed at the remote site. Your selected CLEO, SNA or BSC software is packaged with 1) an internal modem card for dial-up applications, or 2) an interface card and cable for use with your existing modem. There's no waiting for non-CLEO add-ons. And, you get prompt, single-source service. Package prices range from $995.00 for most standalone packages, up to $2,995.00 for the 32-user SNA gateway.

Call us today to discuss your application.

**CLEO Software**
1639 North Alpine Rd.
Rockford, IL 61107
Telex 703639

**Headquarters:**
USA: **800/233-CLEO (2536)**
Illinois: 800/422-CLEO (2536)
International: 815/397-8110

**Sales and Distribution:**
Eastern U.S.A.: 800/433-CLEO (2536)
In Michigan: 313/540-4600
Western U.S.A.: 800/553-CLEO (2536)
In California: 213/618-0813
Mexico City: 203-0444
Canada, East: 800/361-3185
Canada, West: 800/361-1210
Canada, Montreal: 514/737-3631

CLEO®

CLEO and 3780Plus are registered trademarks of CLEO Software. IBM is a registered trademark of International Business Machines Corporation.

# Washington update

continued from page 6

tive way of switching high-speed data, and it is also expected to improve the transmission quality of the call.

Nynex will market its service under the name Switchway. Pacific Bell will provide the feature as Public Switched Digital Service. Nynex's tariff will be effective May 15. Pacific Bell will file its tariff within 10 days of the FCC's order.

The National Exchange Carriers Association (NECA) filed new common carrier line tariffs with the FCC last week, reflecting the FCC-approved subscriber line charge increase that will go into effect July 1. NECA estimated in its tariff that AT&T rates for long-distance service will decrease by $304.8 million as a result of the subscriber line charge increase. The subscriber line charge reflects a regulatory effort to move to cost-based pricing. Under it, the cost of providing subscribers with a local connection to interexchange networks is charged directly to consumers instead of being incorporated into AT&T's rate base.

AT&T will file its new tariffs reflecting the change in the subscriber line charge with the FCC on May 15. ☑

# 'Open' IBX bows

continued from page 1

ternational Communications Association convention in New Orleans.

At the heart of OAI is a board for the IBX that supports an RS-232 interface. That link provides up to eight asynchronous channels that pass control signals and data between the IBX and applications running on computers, voice processors and other types of products.

The offering resembles the Wang Integrated Office Solution (WIOS), a packaged product that integrates Wang's VS minicomputer with the Wang Business Exchange, a low-end PBX from Telenova, Inc., for which Wang acts as an OEM. With OAI, Intecom's large users will be able to develop WIOS-type capabilities for the IBX using equipment from multiple vendors, instead of having to develop proprietary links for each device supported.

The initial release of OAI, due in July, will enable customers to integrate stand-alone voice- and call-processing applications with the IBX. This type of link will enable voice-messaging systems to interact with the IBX and light message-waiting lamps on IBX phones.

Future OAI releases will support the IBX integration of other applications, including system administrative services and user services.

Administrative services, which will be released over the next five to 10 years, would, for example, enable a customer to compile a file of telephone moves and changes on a personal computer and then update the IBX data base and reconfigure feature access over the OAI link.

The link would also enable developers to build applications that access the IBX data base to prepare customized usage reports. Currently, administrative functions are limited to IBX-resident administration software accessed using an IBX-attached terminal.

User applications that could be developed include the ability of a personal computer user to pass a file of telephone numbers to the switch for automatic dialing. When the call is answered, the switch would then route the call, along with an IBX data base file concerning the called party, to an agent. Wang is currently developing applications that will allow its VS-based Wang Office software to take advantage of the OAI. Intecom said it would publish OAI specifications detailing the data format of the link to encourage third-party software developers to build such applications.

"Publishing OAI for third-party developers means industry-specific application development will come much faster and be much more customized for the user," said David Zweiban, director of the Los Angeles office of the International Telesis Group, a voice/data consulting firm that has been briefed on the product.

According to Greg Carlsted, an analyst with San Jose, Calif.-based Dataquest, Inc., opening up the IBX's architecture will give customers the ability to use existing computers to develop their own applications. "Any time you give users the ability to develop applications they want to use, I think they will be predisposed toward buying it," he said.

Intecom said it will create an advice center to help users develop applications making use of the OAI. However, Carlsted said, "It's not clear to me yet whether or not Intecom currently has the type of software expertise to provide that advice."

Intecom may fall back on Wang to provide some of that software knowledge. Intecom will also provide software designed to assist developers in testing new OAI applications by making an IBM Personal Computer appear as the IBX side of the OAI.

Intecom said it will distribute OAI specifications free of charge to existing IBX users and to Wang value-added resellers. The firm will then charge an as yet undetermined fee to new users and third-party developers. ☑

3270 MICRO-TO-MAINFRAME 3270

Link 8 PCs to Your Mainframe

Only $2,395

No additional hardware in satellite PCs.
No IBM 3274 controller required.

DataTalker 3270 features
- File Transfer
- 12-32 Logical Sessions
- Application Programming Interface (API)
- 3287 emulation for ASCII printers
- Hot Key

At $2,395, DataTalker 3270 is your most economical micro-to-mainframe alternative. Compare it to the traditional coax board solution:

Traditional Coax Board Solution

| | |
|---|---|
| 8 Coax Boards ($595 ea.) | $4,760 |
| IBM 3274 Controller, 51C | $4,885 |
| Total | $9,645 |

SAVE $7,250!

For a FREE micro-to-mainframe guide, call 313/662-2002.

WINTERHALTER INCORPORATED
3796 Plaza Drive, P.O. Box 2180
Ann Arbor, MI 48106
An Interface Systems, Inc. Company

# Net control tools few

continued from page 4

thinks a variety of tools will be needed to manage the department's proposed network.

According to John McQuillan, president of McQuillan Consulting in Cambridge, Mass., Miyashiro is taking a realistic view of net management by recognizing the need to use a variety of tools. McQuillan pointed out that many users are confused by the term "network management," which includes monitoring networks for failure, measuring response time, and providing status reports and displays, as well as reconfiguring and optimizing the network.

Users should not be encouraged to believe a tool will soon be available to perform all of those tasks, McQuillan said. In many cases, users may have to deploy additional equipment and staff to ensure smooth network operations.

Col. Michael Ondrasek, chief of planning and programs for standard systems at Wright Patterson Air Base, agreed users will have to ante up extra resources in the absence of comprehensive network control systems. "There are no free lunches," he said. "You have to be willing to pay the cost of doing business."

Ondrasek, who is involved in the planning of a network that will connect six air bases across the nation, said that in the past, communications managers were concerned only with "providing the pipe" to the user. But increasing reliance on data communications applications has posed security and data integrity problems that are driving demand for management tools, he said.

But not all users are able to throw more money and staffers at network management problems. Lt. Col. Ron Grega, director of central design and programming at Quantico Marine Base in Quantico, Va., said financial constraints are behind his hope that a powerful network management tool will be developed in the near future. Such a tool, Grega said, would allow him to manage his communications operation more effectively without adding staff.

Grega said he believes widespread demand by users for more powerful and functional network management tools will spur vendors to produce such products.

Robert Paretchan, manager of telecommunications for Certainteed Corp., a Blue Bell, Pa.-based manufacturer of roofing and building products, said his company has come to recognize the increasing importance of net management products as it expands its communications operations.

He said Certainteed has for years relied on batch-processing systems for order entry. But the company's West Coast division was able to turn a new on-line order-entry system into a strategic weapon, and that is fueling Certainteed upper management's desire to expand its communications nets. "Diagnosing network problems is something we have to get better at," Paretchan said. "It is becoming an issue with us as we expand our on-line systems." ☑

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

Use the attached form to get your own FREE subscription to Network World.

You can also use the form to make any necessary changes to your name and address.

# INDUSTRY UPDATE

## Stromberg-Carlson sets revenue record

Stromberg-Carlson Corp. trumpeted record annual revenue of $165 million for the year ended March 31, 1987. The company won a volume purchase award from South Central Telephone Co. for the delivery of some 600,000 lines of digital central office equipment between 1988 and 1990. That contract, valued at $100 million to $200 million, will help sustain the 26% growth Stromberg-Carlson anticipates over the next year.

---

▶ *REVENUE RESULTS*

# TIE fights to hold the line

*Key systems maker suffers $1 million loss in first quarter.*

**BY PAM POWERS**
Senior Editor

SHELTON, Conn. — Although it trails just behind AT&T as the No. 2 competitor in the overcrowded key systems market, TIE/Communications, Inc. is fighting the whipsaw effects of product price erosion and sluggish market growth while trying not to drown in a sea of red ink.

Last week, TIE reported a first-quarter loss of $1.1 million on revenue of $63.2 million. Although that figure represents a healthy 50% improvement over losses sustained for the same quarter last year, revenue took a disappointing 24% slide from $83 million the year earlier.

William Merritt, TIE's executive vice-president, attributed the loss to the lasting effect of two critical marketing mistakes made between 1982 and 1984.

TIE entered the residential telephone market with the purchase of Mura Corp. in 1982, pinning high hopes on what promised to be a potentially rich new revenue source. But the market never panned out. TIE was "swept up in a market collapse" in early 1984, Merritt said. Mura was sold off in November 1985.

But perhaps more damaging was a marketing blunder the company made with its key system product line, which represents the bulk of TIE's annual revenue stream (the company also markets a high-end digital private branch exchange and a voice/data switch).

TIE erroneously bet that the regional Bell holding companies would become major distribution channels for its low-end — 200 lines and under — key systems after the RBHCs were divested by AT&T. "We geared up for large sales through the RBHCs in 1984, and their ability to move products in large quantities just never materialized," Merritt said.

That left TIE with bloated inventories and a large staff, both of which had to be trimmed to offset slow growth in sales.

"Everything hit TIE at once," said David Keeler, an industry analyst with San Jose, Calif.-based DataQuest, Inc. "TIE was overextend-

See **TIE** page 10

### Financial focus

For the quarter ended March 31

| Vendor | 1987 Revenue | 1987 Earnings | 1986 Revenue | 1986 Earnings |
|---|---|---|---|---|
| [illegible]ve, Inc. | [illegible]19,631 | ($6,869) | $23,496 | $1,043 |
| Fibronics International, Inc. | $8,765 | $164 | $7,155 | $106 |
| [illegible], Inc. | $51,962 | $4,290 | $46,843 | $1,594 |
| The Southern New England Telephone Co. | $364,100 | $35,500 | $348,600 | $34,000 |
| [illegible] | $204,600 | ($18,800) | $226,400 | ($15,300) |

Dollars in thousands

SOURCE: NETWORK WORLD

---

▶ *AMERICAN ELECTRONICS ASSOCIATION*

# AEA to lobby on trade

WASHINGTON, D.C. — More than 100 corporate members of the American Electronics Association (AEA) will send senior executives here this week to lobby federal officials and testify before the Senate Finance Committee concerning the primary international trade bill in Congress, S. 490.

The effort comes as communications and electronics trade issues heat up the halls of Washington, and on the occasion of AEA's annual Capitol Caucus. The AEA is a trade association representing more than 3,000 electronics and communications companies, including AT&T, IBM, Siemens Communications Systems, Inc., 3Com Corp., M/A-Com, Inc., Gandalf Data, Inc., Tellabs, Inc. and Novell, Inc.

A spokesman for the organization said the purpose of the caucus is to focus the attention of key congressmen, such as Sen. John Danforth (R-Mo.), chairman of the Senate's Finance Committee, on issues and legislation that AEA has identified as important for U.S. electronics companies. "Global competitiveness" for U.S. companies is the overarching theme on which the AEA wants its members to build their legislative positions.

"Telecommunications companies are going to want to talk about telecommunications portions of the trade bill," said Jon Kent, an AEA spokesman. "The way it's set up right now, the Finance Committee won't be putting a telecommunications portion in the bill."

Kent said Sen. Danforth was resisting the efforts of telecommunications industry lobbyists in order to keep sector-specific legislation out of the overall trade bill.

The AEA also believes its members are hurt by the U.S. domestic budget deficit.

Other factors AEA wants its members to identify as problems for U.S. trading strength include adverse foreign trading rules and regulations, export controls, unnecessarily high capital costs, unreasonably high tax rates and lagging tax-oriented incentives for research and development.

Executives taking part in the caucus will hear speeches from Sens. Pete Domenici (R-N.M.) and Pete Wilson (R-Calif.) ◘

---

VENDOR VIEW

**JEROME F. KEMP**

# Future benefits of ISDN appear not so far away

Although there has been much discussion of Integrated Services Digital Network as the future of voice/data/video communications, a lot of the talk focuses on the benefits that will not be available until ISDN is widely implemented. However, as early as 1988, users can begin to reap the benefits of ISDN when tariffed service offerings and customer premises equipment are expected to be available.

Initial customer premises equipment offerings will include internal and external terminal adaption and network termination devices so that users' existing equipment can be adapted to the ISDN networks provided by local and interexchange carriers. As a result, users will be able to connect their existing equipment to ISDN networks and immediately reap some benefits.

Initial ISDN offerings, for example, will simplify users' in-building wiring requirements because ISDN specifies inexpensive twisted-pair wiring as the transport medium within the customer premises.

With ISDN, users will be able to readily move, add and change devices on the network because twisted pair is already extensively available in all buildings as a result of existing telephone communications. In addition, connecting a device to ISDN is as simple as plugging in a telephone.

In its initial implementation, ISDN will also provide for integrated access, that is, one communications transport mechanism for all communications, including voice, data, telemetry and video. With ISDN, users will have to understand and manage only one protocol and two network access interfaces (Basic Rate and Primary Rate).

Today, users must deal with a protocol and interface for each type of communications line: voice, dedicated analog, digital and so on.

In addition, integrated access will simplify troubleshooting of communications lines by reducing the number of lines to one. In fact, ISDN protocol analyzers are available today to help users with the task of troubleshooting.

Without integrated access, users must deploy, for each type of communications line, specialized equipment and experienced personnel to monitor and correct problems.

See **ISDN** page 10

*Kemp is senior engineer of advanced development and project manager for NCR Comten, Inc.'s ISDN trial efforts. He represents NCR Corp. on the T1D1 Technical Subcommittee of the Exchange Carriers Standards Association.*

# BRIEFS

**Connections Telecommunications, Inc.** of West Bridgewater, Mass., and **Logica UK Ltd.** of London recently signed an agreement providing for the joint marketing of telecommunications software, and tariff and consulting services in the U.S. and Europe.

Connections Telecommunications will sell and support Logica's computer capacity-planning system in the U.S. In Europe, Logica will market Connections Telecommunications' Multipoint Network Design Systems and Distributed Design System.

$

**Centel Corp.** announced several management changes affecting its business systems, telephone, cable television and corporate data services operations. Effective May 15, George B. Kemple, vice-president of **Central Telephone Co. of Nevada/Texas,** will become president of **Centel Communications Systems.** James J. Kropid, vice-president of data services, will succeed Kemple as vice-president.

Succeeding Kropid will be Edward W. Mullinix, Jr., vice-president and general manager of **Centel Cable Television Co. of Iowa.** Due to these changes, **Centel Business Systems'** current operations has been renamed **Centel Communications Systems.** Centel Business Information Systems has become Centel Information Systems.

$

**Orion Group, Inc.** will integrate its IBM connectivity software with **Prime Computer, Inc.'s** new Prime EXL 316 supermicrocomputers. The software package will enable users of the Prime EXL 316 to communicate with networks supporting IBM's Systems Network Architecture.

$

**Western Digital Corp.** and **Faraday Electronics, Inc.** signed an agreement under which Western Digital will acquire Faraday, a Sunnyvale, Calif.-based company that manufactures board-level and core logic products. Western Digital, located in Irvine, Calif., will issue approximately 1.5 million shares of common stock for all of the outstanding Faraday stock, warrants and options.

$

**United Telecommunications, Inc.** has reached agreements in principle to acquire **Community Directories, Inc.** and **GLB, Inc.,** a holding company of National Suburban Directories, Inc. These companies, which publish telephone directories in suburban Chicago, will become subsidiaries of United Teledirect, a United Telecommunications company. ☑

# TIE holds line

continued from page 9

ed in the wrong places. It bet heavily on the RBHCs and residential sales, and neither worked out." Keeler maintained that TIE had additional problems in the form of disgruntled distributors who felt alienated by TIE's RBHC distributor connection.

Since 1984, TIE has fought to regain its momentum. Merritt said inventories and costs are now under control. Staff has been reduced from a high of 3,000 to some 1,500 employees today. And the company is banking on growth in international markets to sustain it, in addition to continued domestic growth in sales of key systems.

But the key systems market is characterized by heavy competition — Merritt himself estimates 64 vendors — and declining prices. "The market is oversaturated, as is confirmed by the number of mergers, alliances and exits," Keeler said. "It also suffers from extremely low growth, about 1% to 2%. It's questionable whether anyone is making a profit there."

Merritt conceded flat to slow market growth and cheaper unit prices, but he said the growth is still there, and he expects a market shakeout that will eliminate a number of companies. "We will continue to be a major player," he said. ☑

# ISDN benefits not far away

continued from page 9

The benefits of out-of-band signaling provided by the D channel of ISDN will also be immediately available. Users will be able to manage calls through the D channel while simultaneously sending information — voice and data — over the information-bearing B channels. This D channel signaling is the crux of integrated access. The signaling identifies to the network what type of information will be transmitted.

Today, the situation is reversed. The network dictates to the user what type of information can be sent over various subscriber lines. The D channel also provides more bandwidth for pure information to be transmitted over the B channels because call setup and tear-down information is sent over a separate channel.

The rapidly expanding roster of ISDN trial installations indicates that local exchange carriers and their customers are eager to test the benefits ISDN can offer them today.

While these initial implementations of ISDN are appearing on a limited basis now, the benefits of ISDN will be available to others as soon as service offerings are tariffed and customer premises equipment hits the market. ☑

RUNNING ETHERNET ON IBM CABLE IS EASY IF YOU HAVE THE RIGHT CONNECTION.

Until now, it was impossible to run Ethernet LANs on IBM twisted-pair cabling.

You had to install a new, second cabling system for Ethernet applications. Or you could forego the advantages of Ethernet altogether.

Those were your choices.

But if you waited for a better alternative, congratulations. You saved your company a lot of money.

Because now for the first time you can run Ethernet LANs on your existing IBM Type 1/Type 2 cabling segments. At 10 Mb/second over 100 meters. On a star topology, you'll have a 4 kilometer network.

So now you forego the second cabling system *and* the big expense. You get Ethernet, and you get it now.

It's how Boeing, Texas Instruments and Carnegie Mellon University are running Ethernet.

On the IBM Cabling System, via LattisNet® from SynOptics,® based on the original design developed by Xerox at the Palo Alto Research Center.

Call us to find out how much time, money and trouble you'll save by running Ethernet on your IBM cable.

With LattisNet, it's not only possible, it's easy. SynOptics, 329 North Bernardo, Mountain View, CA 94043.

**Call 415-960-1100**

SynOptics
Communications, Inc.
Formerly Astra Communications

Trademarks—Boeing: The Boeing Company; Texas Instruments: Texas Instruments Incorporated; Xerox: Xerox Corporation; SynOptics & LattisNet: SynOptics Communications, Inc.

# TELECOM TRENDS

“We cannot approach the 1990s as a utility alone. [Our long-term objective] is to obtain more than one-third of our earnings from diversified, nontraditional businesses.

**Richard D. McCormack**
President and chief operating officer
US West, Inc.

CROSS TALK

**BOB WALLACE**

## VSAT nets: Is the thrill really gone?

Talk of the benefits of very small aperture terminal networks, which approached a roar in 1986, has been reduced to a whisper this year.

The first wave of user pioneers included K Mart Corp., Williams Pipe Line Co., Amoco Corp., Farmers Insurance Group, Burlington Coat Factory Warehouse Corp. and several data processing service companies.

But the jury is still out on whether these networks are meeting user expectations. Subsequent users appear to be waiting to hear early users' evaluations of these small earth station networks.

The meteoric rise in popularity of private T-1 networks, fed by the enormous amount of fiber-optic cable installed by long-distance carriers in the last two years, seems to have stolen much of the thunder from VSATs.

The availability of low-cost fiber transmission facilities from AT&T, MCI Communications Corp., US Sprint Communications Co., members of the National Telecommunications Network (NTN) and other carriers such as Lightnet, Inc. has encouraged many users to adopt T-1 backbone nets as the foundation for their long-distance communications plans.

According to a high-ranking source within AT&T, many of these networks are used at only a portion of their capacity. The T-1 network of one large customer, the source said, is only operated at half capacity.If we need to cut, the preceding sent. might be a good one since it doesn't really say anything. bl Companies with a glut of T-1 capacity may want to optimize that investment before sinking more capital into VSATs.

The rise of packet-switching technology for wide-area networks has also eaten away at the allure of satellite networking. Large users, such as Ford Motor Co., that once claimed to be leaning toward implementing VSAT networks have opted for terrestrial networks instead.

VSAT vendors have suffered as a result. Equatorial Communications Co., considered by many the pioneer of the two-way VSAT network, is experiencing financial problems. The company recently underwent a financial restructuring and has experienced difficulty paying for leased satellite transponders.

Industry trouble hinted at by this and other incidents may be giving pause to other potential users. There has been precious little heard from the first wave of VSAT users.

See **VSATs** page 13

*MARRIOTT PBX PURCHASE*

## Chain opts for NTI net

### *Network will have 15,000 lines, uniform dialing.*

**BY BOB WALLACE**
Senior Editor

WASHINGTON, D.C. — With its current PBX stretched to capacity and 2,000 additional end users scheduled to be added by year end, the Marriott Corp. has begun to construct a network capable of handling 15,000 lines that will provide corporate end users with a uniform five-digit dialing plan.

The network of the $5 billion hotel heavyweight will include $7.5 million worth of Northern Telecom, Inc. switching equipment. Six Marriott office sites, each equipped with Northern SL-1 private branch exchanges, will be connected by T-1 1.54M bit/sec digital links to a Northern SL-100 switch to be installed at the firm's headquarters here.

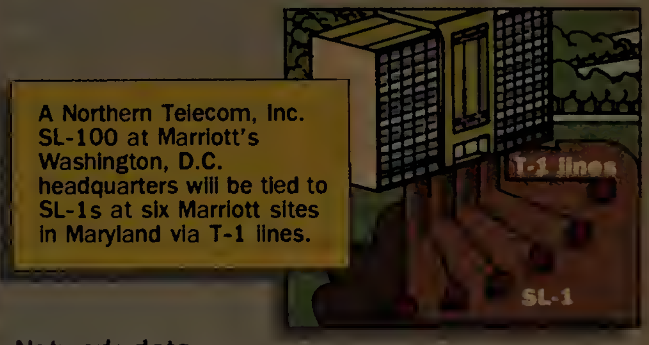
Under the agreement, the switch maker will also provide 50 additional SL-1s for Marriott's 150-room Marriott Courtyard Hotels, many of which are still under construction, but these switches will operate as stand-alone facilities.

A Northern Telecom SL-100, configured to support 5,500 stations, will replace Marriott's overburdened Rockwell International Corp. Wescom 580, a 2,400-line switch that is currently serving roughly 3,000 end users.

Harry Stewart, corporate telecommunications director for the hotel chain, said the company, which is growing 20% annually, simply outgrew its PBX. “As part of our corporate headquarters expansion program, we are installing this new telephone system, which will

See **Chain** page 13

**Marriott Corp.'s planned voice communications systems**



A Northern Telecom, Inc. SL-100 at Marriott's Washington, D.C. headquarters will be tied to SL-1s at six Marriott sites in Maryland via T-1 lines.

**Network data**

No. of initial lines served: **5,500**
Maximum line capacity: **15,000**
SL-100 add-on: **automatic call distribution system**

**Stand-alone voice systems**

The company will also equip each of 50 Marriott Courtyard Hotels with an SL-1 private branch exchange to serve 175 stations.

Completion of Marriott's SL-100/SL-1 network will provide users at these sites with a uniform five-digit dialing plan.

SOURCE: MARRIOTT CORP., BETHESDA, MD.

*LONG-HAUL SQUABBLE*

## BOCs deny improper spending

**BY KARYL SCOTT**
Washington, D.C. Correspondent

WASHINGTON, D.C. — The Bell operating companies fired off a salvo of comments to the FCC recently in reply to MCI Communications Corp.'s claim that the BOCs were using ratepayer revenue to finance expansion of their fiber-optic network facilities and the development of data bases used to offer 800 services.

The BOCs claimed MCI's charges were without merit and asked the Federal Communications Commission to dismiss them, saying they have adhered to FCC rules when making expenditures to enhance their networks.

MCI claimed in an April 9 letter to the FCC that the BOCs were “overbuilding” their networks using fiber optics to support future expansion into the long-distance market. The new fiber-optic facilities “can only be used by the BOCs as a facilities base for the future provision of interexchange service,” MCI claimed in its filing (“MCI fighting BOC 800 data bases,” *NW*, April 27).

BOC development of data bases used to provide 800 services represents “costly efforts of unprecedented magnitude to expand the BOCs' networks in order to position themselves to provide presently prohibited services,” according to MCI.

MCI also claimed that “the expected interexchange carrier demand for the BOC 800 data base does not justify the exorbitant expense, consuming more than half a billion ratepayer dollars thus far. The only way the BOCs will be able to recover their extravagant costs for this nationwide system will be to unlawfully shift the costs of development onto their monopoly services.”

> The BOCs view the MCI charges as a red herring to divert attention from MCI's real agenda.

The BOCs are currently developing data bases that they hope to use to offer enhanced toll-free 800 services, such as the ability to switch customers to various 800 service vendors based on rates, time of day and location.

The BOCs view the MCI charges as a red herring to divert attention from MCI's real agenda, which is to prevent the BOCs from entering the long-distance market. If the government lets the BOCs compete in the interexchange market, MCI's market position could suffer.

Nynex Corp. refuted MCI's allegation in a letter to the FCC that stated, “MCI makes a wholly speculative leap and concludes that BOC service data bases and fiber-optic facilities will be used to provide services restricted under the MFJ, but does not present a single fact which supports this extraordinary speculation.”

The letter went on to say, “There is simply no reason to associate a technology such as

See **BOCs** page 13

▶ *TARIFF SEMINAR*

# Service quality a major net factor

## *Network design decisions go beyond cost considerations.*

**BY MICHAEL FAHEY**
Staff Writer

BETHESDA, Md. — Although tariff shopping and network-optimization techniques can sharply reduce users' monthly communications costs, decisions on major network design changes hinge on a variety of business considerations, according to communications managers attending a tariff seminar here last week.

"Reducing cost is obviously important," said Bill McWaid, tariff manager for Motorola, Inc., who conducted the seminar sponsored by the Aries Group, Inc. "But service quality and other issues are important factors in making decisions about the network."

Although increasingly sophisticated network management and cost analysis tools are making it easier to gauge and compare the true cost of communications services, evaluating network design is a business decision rather than an engineering decision, said Robert Ellis, president of the Aries Group.

"I can explain the savings from using AT&T coordinated access," said Ellis, referring to a means of acquiring AT&T managed and maintained private lines at a price lower than the AT&T total service offering. But users must decide for themselves whether the savings from coordinated access is worth the difficulty of managing a more complex network with components billed by a number of carriers, Ellis said. "A network is not an engineering entity, it is a political entity," he continued.

> "Reducing cost is obviously important. But service quality and other issues are important factors in making decisions about the network," said Bill McWaid.

John Grego, assistant telecommunications officer with Mellon Bank in Pittsburgh, agreed, saying that while cost considerations are important to his company, the issue of network stability is paramount. Mellon provides communications services to smaller banks throughout the country and often involves client banks in design considerations.

"Obviously, the larger the dollar figure, the more saving becomes important," Grego said. "But the stability of a client bank's services is very important."

Sharon Black-Keefer, manager of voice communications for Northwestern National Life Insurance Co. in Minneapolis, said some network design decisions are relatively painless. Her company recently replaced its banded WATS service with virtual WATS offerings. "I didn't conduct any special studies, but I didn't feel as if the banded WATS service was as cost-effective as the new ones," she said. In other cases, Black-Keefer said, in-depth analysis of a particular design or service is needed to make network configuration decisions.

When Northwestern National installed two T-1 circuits for voice traffic between company headquarters in Minneapolis and remote branch offices, Black-Keefer had MCI Communications Corp. and US Sprint Communications Co. each provide a T-1 circuit. The company is currently evaluating each carrier's service for price and reliability, she said.

## TELECOM TIDBITS

**Telenet Communications Corp.** and **Churchill Communications Corp.** have entered into a distribution agreement that will allow the latter company to market Telenet's Telemail Xpress service for hard-copy delivery of electronic mail.

Telemail Xpress hard-copy delivery service enables users to transmit messages electronically to service centers across the country, where they are then laser printed. Once printed, they are processed by the U.S. Postal Service for delivery as high-impact first-class mail, generally within two days, Telenet claimed.

☎

**FTC Communications, Inc.**, a subsidiary of National Gateway Telecom, Inc., introduced an International Business Service that connects the West Coast with the UK and continental Europe via a satellite earth station located at the Bay Area Teleport's complex near San Francisco.

Rates for a 56K bit/sec or 64K bit/sec link start at $4,500 per month with a three-month service commitment.

Data transmission speeds of up to 2.048M bit/sec are offered, as well as rate reductions up to 10% for users opting for 12-month commitments for service above 64K bit/sec.

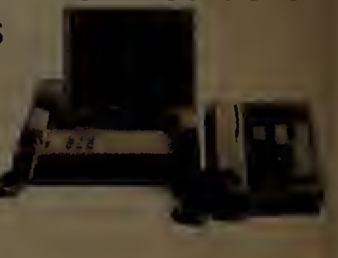
© 1987 AT&T

How to get all your business

Unifying company-wide communications to help remote offices pull together. AT&T Comes Through.

The solution: the AT&T System 85. No other voice and data system today helps streamline communications among far-flung business outposts so effectively. In an AT&T System 85 environment, the switches and systems at all of your locations can work together as *one* switch, *one* system. Result: Voice and data applications work the same way everywhere. Information at any one location is instantly available to all locations. Everybody in your organization is fingertip-close to everybody else.

Across the hall or across the country, the AT&T System 85 permits people using different kinds



## Chain picks NTI

continued from page 11

allow us to meet our end users' voice communications requirements," he explained. A 285,000-square-ft. addition to its headquarters building will mean 2,000 more end users for the SL-100.

Stewart said the SL-100 would initially be used to switch voice calls but will likely handle data at a later date. Marriott will be looking to switch one or two channels of data through the T-1 network to the SL-100, he said.

The telecommunications director said a company dialing plan is one of the project's highest priorities. "One of the primary purposes of the network is to provide a uniform dialing plan," he said.

"End users at each [of the six] remote sites have direct inward dial numbers," Stewart said. Employees moved back to corporate headquarters will retain the last four digits of their direct inward dial number as their extension.

Marriott will also purchase an automatic call distribution (ACD) system as part of the contract. Stewart said the ACD would not be used in a reservation or telemarketing application. "We will use the ACD in situations where we have departments with a large number of incoming calls but few people there to answer them," he said. "We will use the ACD with recordings to provide our customers with better service." The ACD will provide management reports that will help evaluate manpower needs in these departments.

Although the SL-100 will provide a variety of reports for Marriott's communications staff, the corporation's call accounting system, already in use, will provide data needed to optimize use of its telecommunications resources. "The SL-100 will give us data on the use of various trunk lines, trunk groups, channels on a T-1 line and the T-1 lines themselves," Stewart said. "But our call accounting system will give us even more detailed reports. We will be able to use our call accounting data to help us compare costs of different services. If we were looking at a specific application," Stewart continued, "we could compare the cost of a T-1 line to the cost of using a WATS service or another common carrier service."

Stewart said Marriott worked very closely with Northern Telecom to develop applications for the hotel company's needs. Each Marriott Courtyard Hotel will be equipped with roughly 150 Northern Telecom Unity telephones designed specifically for use by hotel guests. The switch maker said each of these sites will be equipped with custom software to provide special functions unique to the needs of the hotel/motel industry.

## BOCs deny improprieties

continued from page 11

fiber optics with prohibited services and, thereby, put a cloud over Nynex's ability to provide permitted services through the most efficient and effective technology available."

BellSouth Corp. maintained that MCI's claims are totally lacking in merit. The FCC currently has a proceeding under way to consider the BOC 800 data base issue, and MCI had full opportunity to comment on the issue during the public comment period, the company said. MCI is using its most recent petition to reassert its objections to various features of the BOC 800 data bases.

The BOCs went on to say that MCI would have the opportunity to comment on the research and development costs associated with the BOC 800 data base services when tariffs are filed for those services.

Bell Atlantic Corp. said MCI's request for a special investigation into BOC expenditures is completely unnecessary. "Bell Atlantic is making these investments to meet its legal obligations as an exchange carrier. The investment in 800 data base capability will enable us to provide equal access for 800 service providers such as MCI. Interoffice fiber-optic cable is being deployed where it is an efficient and economical means of providing authorized service."

Less than 4% of Bell Atlantic's 1986 network construction expenditures were spent on these investments, and "these modest costs are being recovered in accordance with the FCC's rules," according to the company's reply to the FCC.

## VSAT nets

continued from page 11

VSAT vendors may also find they have to present the offering as a one-stop shopping solution, for which many users have shown an appetite. Most of these vendors own or make one part used in VSAT networks and acquire the other pieces from a variety of sources.

While many communications managers like the idea of playing vendors off one another when shopping for price, they rail at the idea of troubleshooting multivendor networks.

And what of satellite network education programs? How will prospective users learn about what it takes to build a VSAT net if early users aren't talking? These shortcomings must be addressed if vendors expect to expand their VSAT networking businesses.

locations into the same boat.

of equipment in different places to communicate as easily as if they were all sitting around one big table.

For a complete run-down on all the ways the enhanced AT&T System 85 can help your far-flung operations pull together, contact your AT&T Account Executive. Or, for our outpost nearest you, please call 1 800 247-1212. From equipment to networking, from computers to communications, AT&T comes through.

AT&T
The right choice.

# Infotron introduces Infostream NX4600

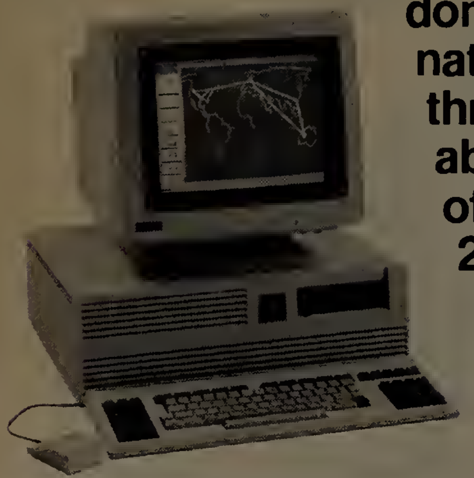
## Real T1 networking. Real T1 network control.

High-capacity T1 networking. With all the promises out there, it's hard to tell fact from fiction. Especially when you're talking T1 speed with network control.

Fortunately, the Infostream® NX4600 Network Exchange is for real. Based on Infotron's proven INX™ switching technology in use around the world. And available now.

The NX4600 accommodates your network's growth—up to 64 nodes with automatic priority-based rerouting, 96 high-speed links or 4000 local channels. You can satisfy both domestic and multinational networking needs through the NX4600's ability to handle a range of speeds up to 2.048 Mbps.

Multiple clock handling prevents data loss. And digital bridging permits cost-savings through more efficient bandwidth use and the use of fewer computer ports in multidrop applications.



Connectivity to all Infotron products, including the Infostream 1500 and 2000 high-speed muxes used by major corporations worldwide, protects your network investment.

Add Infotron's INM® Integrated Network Manager, a full-color graphics-driven management tool, to the NX4600 and you're in control. Now you can monitor, diagnose and configure from a single site. Not just the T1 links, but the entire network.

The Infostream NX4600 and the smaller-capacity NX3000. They make cost-effective, flexible and manageable T1 networking real. Right now.

For more information, call 1-800-345-4636 or 1-609-424-9400.

INFOTRON

**You're In Control.**

See us at ICA. Booth #939.

# DATA DELIVERY/ NET MANAGEMENT

> “In the T-1 market, appearance is 50% of the game. A customer often associates one company with a specific feature, even though many other vendors may supply the same capability.
>
> **Tim Zerbiec**
> Vice-president
> Vertical Systems, Inc.
> Dedham, Mass.

▶ *RELOCATION REALITIES*

## Planning is key to firm's move

### *Com/Energy's Overlan tackles the task.*

**BY PAUL KORZENIOWSKI**
Senior Editor

CAMBRIDGE, Mass. — Three months ago, few telecommunications managers would have traded places with Kerry Overlan, telecommunications manager at Commonwealth Energy System (Com/Energy).

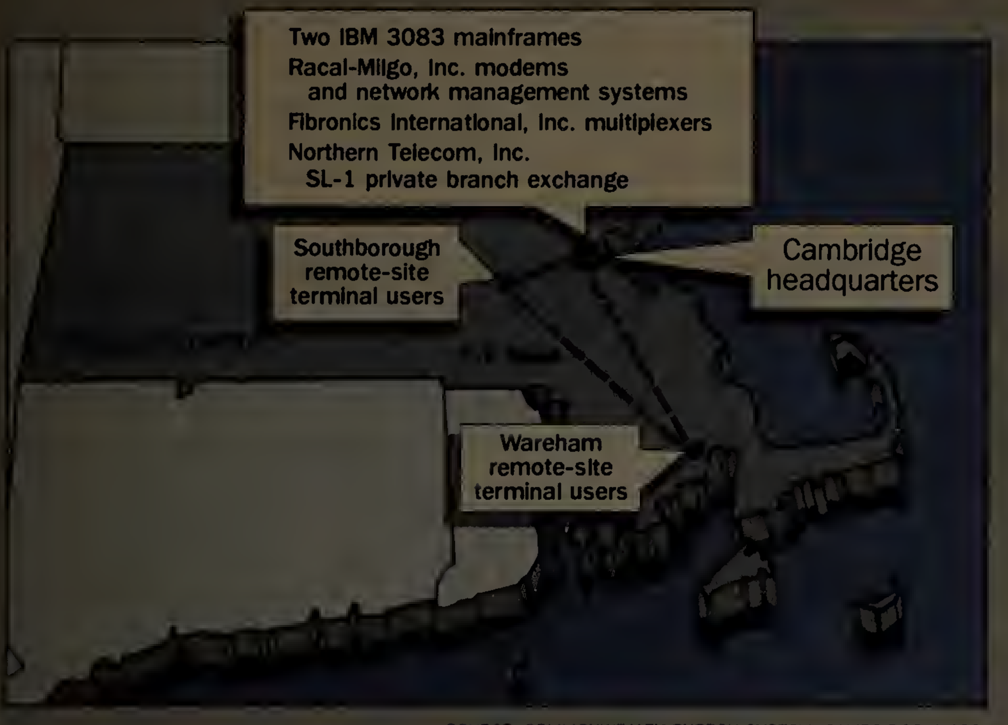
Overlan was hired in October 1985 and charged with the responsibility of making sure business proceeded normally during the company's relocation of 350 corporate headquarters employees.

The home office employees were to be moved into a new building overlooking the historic Charles River here.

The task was made all the more challenging for Overlan and his staff of seven telecommunications specialists because the company decided to use the upheaval of the move as an opportunity to replace its entire communications system. What's more, Com/Energy gave Overlan's team one weekend to

See **Planning** page 16

Commonwealth Energy System builds new communications network


Two IBM 3083 mainframes
Racal-Milgo, Inc. modems and network management systems
Fibronics International, Inc. multiplexers
Northern Telecom, Inc. SL-1 private branch exchange
Southborough remote-site terminal users
Cambridge headquarters
Wareham remote-site terminal users

SOURCE: COMMONWEALTH ENERGY SYSTEM, CAMBRIDGE, MASS.

▶ *NET MANAGEMENT SYSTEMS*

## Cincom wins IBM users

### *Managers see benefits of Net/Master.*

**BY PAUL KORZENIOWSKI**
Senior Editor

SAN DIEGO — When it comes to network management, most IBM shops are leery of relying on anything but IBM products.

“There is always some resistance to purchasing a non-IBM product,” noted Jim Clark, system programmer at the state of Minnesota's Information Management Bureau in St. Paul, Minn.

But Clark and others have bitten the bullet and opted for a network management system from Cincom Systems, Inc. instead of similar IBM products, praising the functionality and ease of use of Cincom's Net/Master.

Clark was one of a half-dozen communications managers interviewed by *Network World* during Cinteract'87, Cincom's users group meeting held here last month at the Hotel Inter-Continental. Each manager had to overcome some corporate hesitancy to install Net/Master, Cincom's modular host network management system that supplies network management, network control and security features.

**Minnesota makes the move**

The state of Minnesota's move to non-IBM network management began during the summer of 1984 when the Information Management Bureau began migrating from TCAM, an IBM telecommunications processing product, to VTAM. Since VTAM lacked many network management functions provided by TCAM, the bureau decided to supplement VTAM with a network management package.

The bureau wrote a comprehensive request for proposal to determine the most robust network management package available.

“We spent a great deal of time specifying certain functions because we wanted to make sure we purchased the best product,” Clark said. In February 1985, the bureau installed the RFP winner, Net/Master, which was deemed much easier to use than comparable IBM products.

Other users echoed Clark's elation about Net/Master's ease of use. “An IBM network operator can probably perform most of the functions that a Net/Master operator can do,” said Dennis Turek, software analyst for technical services at Anheuser-Busch Co., Inc. in St. Louis. “But it will take the Net/Master operator a lot less time to complete those functions.”

A year and a half ago, the company replaced IBM's Network Communications Control Facility (NCCF) and Network Problem Determination Application with Net/Master.

Net/Master's ease of use stems from the use of Network Control Language, a fourth-generation language operators use to tailor Net/Master's functions for their network. An IBM operator hones Big

See **Net/Master** page 17

**DATA DIALOGUE**

**BY HOWARD BERNSTEIN**

## ABCs of IBM's Network Performance Monitor

Management of a medium- to large-scale IBM Systems Network Architecture network demands sophisticated management tools. These tools should include the ability to collect and report on network performance data, which can assist network operators in system tuning and capacity planning. IBM's Network Performance Monitor (NPM) program was created to assist network support personnel in managing the performance and growth of SNA-based communications networks.

NPM is an on-line, interactive monitor and display facility that identifies network traffic bottlenecks and collects and stores network performance data.

The product provides real-time graphics and historical analysis of interactive local or remote SNA session data. The network data collection and analysis part of NPM is supported by IBM's 3705, 3725 or 3720 Communications Controllers running IBM's Advanced Communications Function/Network Control Program (ACF/NCP) Version 2, 3 or 4, using the integrated Network Performance Analyzer (NPA) data collection functions. The product can be used by network operation system programmers and network managers.

The network performance data collected by NPM can be used to monitor network traffic volumes and response times, display on-line or summary response time data and show network component utilization. A file management facility enables real-time network changes to be achieved.

Network managers have to balance demand for network services against budget objectives. These conflicting requirements often require the addition of network components that can create either excess capacity or contribute to further degradation of network performance. By using a tool like NPM, network managers can gauge the effect of planned network changes. In addition, NPM's ability to measure and verify the results of problem resolutions can help a user tune his network.

See **Net tool** page 18

*Bernstein is editor of “SNA Perspective,” a monthly newsletter published by Communications Solutions, Inc. in San Jose, Calif.*

# Planning is key to move

continued from page 15

have the new equipment up and running and stipulated that critical applications, such as customer service, could be down for a maximum of a few minutes.

On Friday, Feb. 20, the telecommunications staff, none of whom had ever taken part in a corporate move, braced itself for the weekend's uncertainties. Although some mistakes were made, the following Monday morning, employees had dial tones and were able to use their terminals. "As trite as it may sound, the key to making the move successful was planning," Overlan said.

Planning began the day Overlan was hired. After reviewing the company's telecommunications budget, he deduced that the company could save significantly by purchasing rather than continuing to lease equipment.

In addition to cutting costs, purchasing equipment would give the company better control of its network. "Users like us realize we have to be our own telephone company," Overlan said. Since the corporate move was already in the works, the company decided to coordinate the two activities.

Com/Energy, with 2,500 employees and revenue close to $700 million, has three key sites. The Cambridge office houses two IBM 3083 mainframes, which perform most of the company's data processing functions. An office in Wareham, Mass., on Cape Cod is used to support Cape Cod customers, and a third office in Southborough, Mass., serves customers in the western part of the state.

Before the move, Com/Energy used analog lines operating at speeds of 9.6K bit/sec to move data between the various offices. AT&T Dimension and System 85 private branch exchanges supported the company's voice requirements.

With the decision to purchase new equipment, Overlan and his staff set out to evaluate products, a key part of which was the selection of PBXs.

Overlan selected Northern Telecom, Inc. SL-1 PBXs, citing the vendor's long-term viability, the switch's proven track record and its superior automatic call distribution system. Overlan also said the SL-1 has a sleek T-1 interface.

The T-1 interface was critical because Overlan intended to link the three Com/Energy sites with facilities provided by New England Telephone. The company entertained bids from a number of T-1 multiplexer makers for multiplexers to use with the facilities, including Timeplex, Inc., Amdahl Corp. and Network Equipment Technologies Co. (NET) in Redwood City, Calif.

Com/Energy bought NET equipment, Overlan said, because, "we thought NET had the best equipment on the market, and they had satisfied customers."

Racal-Milgo, Inc.'s 9.6K bit/sec modems and its network management systems were selected. "Racal's network management system had superior color graphics capabilities," Overlan said. The network management system will be used to monitor the various lines that connect the company's customer support centers.

Com/Energy contracted Allcom, Inc., a local company, to wire the building. Twinaxial cable was chosen for data applications and twisted pair for voice. A fiber-optic backbone network, equipped with multiplexers from Fibronics, Inc., links the company's four floors and supports data transmission.

The vendor selection process ran from June to August, a process that left the company with little time for the move originally scheduled for November and later pushed back to February.

To ensure smooth sailing during the move, Com/Energy held monthly meetings and invited all vendors and key Com/Energy personnel, such as Dick Schofield, who oversaw the move, and Jim Brown, the chief executive officer. "We tried to make sure that everyone was working in sync," Overlan said.

At one meeting, vendors explained how their equipment worked, so everyone had a broad picture of what the company was trying to accomplish. Subsequent meetings were used to try to identify potential snafus.

When the move was taking place, a high priority was keeping customer service lines open, and the company opted to cut over the lines one at a time.

"None of the customer service lines were down for more than 30 seconds," Overlan said. "The first call on the new system was a customer with a possible gas leak."

Considering the task, the move went well, but there were some minor glitches.

First, the company planned to use patch panels to support its telephone sets. "Patching supplies more flexibility and can be used with a few hundred telephone sets," Overlan said. "With all of our sets, patching became too messy and we decided to use cross-wiring instead."

A second problem involved the

How Wells Fargo leveraged T1 for expansion.

"A part of the rationale in building our network was to position ourselves for expansion," says Bill Stout of Wells Fargo. "It would facilitate our expansion, whether by opening new offices or as the result of the acquisition of another financial institution."

1986 was a year of rapid expansion for this highly successful bank. Fortunately, it already had its N.E.T. IDNX network in place by the time its largest acquisition was announced.

**How Wells Fargo positioned itself for additional connectivity requirements.**

After the acquisition, Wells Fargo found itself with two additional and complete data centers that had to be integrated with their own private network—a normally complicated task that had to be completed within a tight time frame.

Their N.E.T. network gave them the ability to fully integrate their acquisition's data centers from day one.

How?

"It was a function of the relative ease of expandability and flexibility of the backbone network we had in place," Stout explains. "It was relatively simple to order IDNX equipment and T1 facilities, and have both of these positioned so that we could provide immediate connectivity."

With the T1 network in place and the IDNX to channel capacity on demand, Wells Fargo was spared inordinate amounts of time and expense for building individual application connections.

Says Stout, "Our network did a lot to keep us in front of our users' needs last year."

Fibronics multiplexers. The devices can only be connected to a single IBM controller, a limitation that Com/Energy discovered when it tried to add another device to the multiplexer.

Now that it is over, Overlan said the move taught him some things that others may be able to benefit from.

First, make the vendors stick to product delivery dates. Some products arrived late, and the telecommunications staff had to scramble to make sure the devices were properly tested.

Second, make sure that only telecommunications staffers sign for product deliveries. "We were working with two addresses," Overlan explained. "Some pieces of equipment were delivered to the wrong place, and we had trouble tracking down other items that had been delivered."

Overlan also recommends limiting access to wire closets to telecommunications employees. "There were instances when employees from other departments pulled out a plug and accidentally disconnected a piece of equipment," he said.

Lastly, make sure department employees understand what is expected from them. "We told our employees they would be on call for approximately two weeks," Overlan said. During the weekend, the staff camped out at the new building. "I kept some employees on site even though they had little or nothing to do," Overlan said. "It was important that the vendors saw our staff was here, and we expected theirs to be here as well." The staff was also expected to keep its composure whenever problems arose. "You don't want anyone panicking if a problem crops up," he said.

The move was the first phase in a corporatewide telecommunications overhaul. A few weeks later, a Banyan Systems, Inc. local-area network was installed. Com/Energy also plans to install a PBX at the Wareham site and add a voice mail system to its PBXs.

"The company has put in place telecommunications equipment that can serve it for the next 10 years," Overlan said. ☐

# Cincom users

continued from page 15

Blue products by writing Assembler routines, a complex and confusing task.

The ease-of-use differences were demonstrated in a side-by-side comparison. Two years ago, Bell Atlantic Corp., in Philadelphia, installed both products for its network.

Although at first leery of working with Net/Master, operators warmed up to the product, and eventually the company replaced all of its IBM network management products with the Cincom product, according to Nicolas Forte, staff analyst/consultant at Bell Atlantic.

However, not every company was able to convince its network control staff to swap out the IBM products.

In December 1984, Southern New England Telephone (SNET) purchased Net/Master to supplement its network security functions. Net/Master consists of software modules, which can be used as stand-alone products. The security module controls user access to the network and net applications.

> Northwest Mutual Life's network control center found the package so easy to use that it replaced IBM's NCCF and Network Terminal Option packages.

Douglas Miller, senior system programmer at the company, said that the security module is used by close to 35% of the company's users. Despite the fact that SNET has been satisfied with Net/Master, it is not used to manage the company's network. Miller said that SNET network operators continue to prefer IBM products.

Northwestern Mutual Life Insurance Co.'s experience with Net/Master was just the opposite. In October 1984, the Milwaukee-based company purchased a Net/Master module that enables users to log on to two applications, such as IBM's CICS and TSO. Gerald A. Haas, host support group leader at the company, thought the product would be used mainly by application programmers.

But after installing the product, use of Net/Master quickly spread to other users. The company's network control center found the package so easy to use that it replaced IBM's NCCF and Network Terminal Option packages.

The product has helped the company identify a communications problem certain remote users were experiencing. Previously, the problem was slowing network operation to a crawl. Currently, the problem can be circumvented so network performance won't be affected.

Northwestern Mutual is not exactly a true blue IBM customer. The company has three Amdahl Corp. mainframes, a number of Amdahl front-end processors, plug-compatible 3274 series controllers and one IBM 3081 mainframe. ☐

How *you* get more network leverage with N.E.T.

With N.E.T., you focus *more* on leveraging network capabilities and benefits and *less* on installing and running your network.

And you reap such productivity advantages as superior applications availability, greater uptime, and sure-fire connectivity.

How?

With the support of an extremely reliable, extremely intelligent network. With the most efficient network management and network diagnostics systems. And with unparalleled N.E.T.-client service.

All designed to give you more network leverage than your competitors are getting.

And nowhere does leverage become more important than when you expand your network.

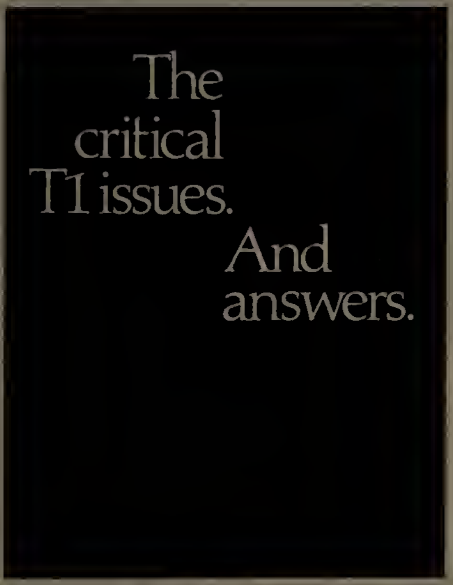
Says Wells Fargo's Stout, "One of the benefits of our network is its extensibility. The network became an integral part of our corporate strategy for expansion."

When you evaluate how to get *best* advantage out of T1, remember this: *Our clients are winning*.

In fact, 35 major corporations can tell you how N.E.T. has strengthened their leadership.

And if you keep your eye on these pages in the near future, some more of them will.

**Call for this free brochure:**
**1-800-232-5599**
**(in CA: 1-800-227-5445)**
***Just ask for Dept.*** NA5


The critical T1 issues. And answers.

*Our clients are winning.*

NETWORK EQUIPMENT TECHNOLOGIES

400 Penobscot Drive, Redwood City, CA 94063, 415-366-4400, TLX 172325

# Valuable net tool

continued from page 15

NPM is sectioned into three components: Network Data Collection and Display, Session Data Collection and Display, and TSO Graphic Subsystem.

The Network Data Collection and Display gathers information from IBM front-end processors by initiating an SNA session with a logical unit in every NCP in the net.

The information collected includes buffer utilization, line polling or device-related statistics such as message data rates.

All network data collection is handled in the NCP. When the mainframe part of NPM requests data, a virtual logical unit, called the Network Performance Logical Unit, transmits the requested counters to the mainframe. Additional monitoring facilities can be called to produce alert messages when utilization exceeds specified thresholds.

The Session Data Collection and Display collects three types of data: Host Transit Time Data, Network Transit Time Data and Operator Transit Time Data. The data is stored in selected files and is available for analysis and online display. Users can tailor the product for certain types and amounts of data.

Finally, the Graphic Subsystem accesses session data files and graphically presents performance data. The product contains real-time monitors that present color displays indicating current performance data in pie and bar-coded charts. This facility operates in the TSO environment and works with the Graphics Data Display Manager.

In order for NPM to obtain the timing values needed to make transit-time calculations, it inspects the VTAM buffer trace for every path information unit (PIU) that passes through the routine. The intercept routine looks at PIUs with First-in-Chain or Only-in-Chain data flow control indicators. The time stamps associated with these PIUs are used to calculate the transit times.

The sequence of events for transit-time calculation is as follows. After a terminal user inputs data and depresses the ENTER, CLEAR or PF key, the controller transmits the data to VTAM. The arrival time of the inbound PIU is captured and the PIU is given to the application program. The application program builds one or more outbound PIUs to be transmitted to the terminal.

VTAM intercepts the outbound PIUs, and the time for the first outbound PIU marks point T2. The outbound PIUs are routed back to the terminal. When the outbound PIUs are received by the terminal, the PIU with the definite-response indicator sends the information back to the host. VTAM receives and traces this response PIU, and the NPM intercept routine marks this time as T3.

The Host transit time, T2 minus T1, is the time spent inside the mainframe processor, and the data consists of the number of PIUs and PIU character counts for all terminals with session collection set active.

Network transit time, T3 minus T2, can be collected for terminals that are in session with non-TSO applications and for which SNA definite-response protocol is requested. For Binary Synchronous Communications terminals, the SNA definite response is simulated by the acknowledge data-link command.

Operator transit time, T3 minus T1, is the sum of host transit time and network transit time and estimates end-user response time.

NPM uses definite response time as the approximation of the inbound PIU time to estimate the network transit time. Users should be aware of limitations to this approach. ☑

*Next week, Data Dialogue will discuss the implications of NPM and product capability questions users should ask vendors.*

©1987, The Wollongong Group, Inc. WINS (Wollongong Integrated Network Solutions) is a trademark of The Wollongong Group. All other product names are trademarks of their respective manufacturers.

In recent months, ads for networking software have all begun to sound alike. Each promises a unique solution to your networking problem (even before the vendor knows what that problem really is). Each tells you the product is easy to use (that is, of course, if everyone is thoroughly trained). And that when you buy the product, you'll get all the technical support you'll need (but they don't tell you how long you must wait to get it).

No wonder user skepticism grows daily!

Properly implemented, network communications software is an effective way of sharing data and peripherals among diverse computer systems. A skeptic, on the other hand, is one who seriously doubts that such a capability exists.

(Now for the commercial)

WINS™ is not a panacea! It's a complete family of communications software products specially designed for skeptics. WINS ensures reliable data transfer and program access among dissimilar computers using a wide variety of operating systems. Transparently! And because of the way WINS software implements U.S. Government standard TCP/IP, it permits easy migration to any of the emerging OSI protocols you may need.

Wollongong also provides onsite installation and user orientation. So you won't have to spend your time training staff. And whenever you need technical support, a call to our SUPPORT HOTLINE will put you in touch with an engineer immediately. If not with a technical manager. And because Wollongong's remote system access capability allows realtime fault diagnosis, many problems can be solved over the telephone.

But in the final analysis, Wollongong's reputation as an authority in the field of network communications is your best guarantee of continuing product performance and support. For example, when AT&T, DEC, IBM, H-P and CRAY each needed to implement TCP/IP on their systems they came to Wollongong.

So throw your skepticism overboard and call Wollongong today. We'll send you the information you need on WINS ... the *anti-skeptic* answer to present and future networking needs. Call 1-800-872-8649 (in California it's 1-800-962-8649) toll free. Or write The Wollongong Group, Inc., 1129 San Antonio Road., Palo Alto, CA 94303.

WOLLONGONG

# LOCAL NETWORKING

## CXI takes trade-ins

Micro-to-mainframe maker CXI, Inc. will take personal computer add-on boards in trade, plus $275 ($375 with single-station software), for its PCOX 3270 emulation boards. CXI will accept its own boards and those from IBM, Digital Communications Associates, Inc., AST Research, Inc. and IDEAssociates, Inc. Without trade-in, the adapter card and software providing multisession capabilities lists for $1,290. For more information, contact Susan Lider at (415) 969-1999.

*MARKET ANALYSIS*

## Shift to PC nets a boon for users

*Terminal-host net vendors feel squeeze.*

**BY PAULA MUSICH**
Senior Editor

Shifting demand and increased competition in the market for general purpose or terminal-to-host networks are spelling benefits for end users and trouble for vendors who fail to keep up with the changes, according to industry analysts.

Because there is greater demand for personal computer networks, traditional terminal-to-host networking vendors, such as Ungermann-Bass, Inc. and Bridge Communications, Inc., have beefed up their support of personal computers, adding flexibility to their product lines and greater integration of personal computers in departmental networks.

At the same time, costs are falling for terminal-to-host network connections. "The terminal-to-host network market has experienced the greatest decline in average connection cost," said Brad Baldwin, an industry analyst with Dataquest, Inc. "The average per-port connection cost has gone down 12.4% per year."

Contributing to the decline in per-port connection costs is an increase in the number of ports available in each terminal server. "The price per unit is going down, and the number of connections on the box is going up," he said.

Connection costs are also going down for personal computer nets, Baldwin said, but the decline is much more rapid for terminal-to-host nets. In 1986, the average terminal connection cost $460, while the average personal computer connection cost was $650.

DEC's hefty share of the terminal-to-host networking market for Ethernet networks has succeeded in forcing independent vendors to compete at this level as well.

Industry consultant Dick Bush, a partner in Katus Technologies, a Santa Clara, Calif., consultancy, estimated that the average price per connection is dropping $50 per year.

Also driving the costs down is an aggressive Digital Equipment Corp., with its DECserver 200 terminal server, according to Bush. DEC previously referred customers who needed terminal-switching capabilities to data-switch companies such as Micom Systems, Inc. or Gandalf Data, Inc. because DEC's higher performance Ethernet could not compete on price. Priced at approximately $440 per port, the terminal server begins to enter the realm of data switches.

Because of DEC's hefty share of the terminal-to-host networking market for Ethernet networks, it has succeeded in forcing independent vendors to compete at this level as well. Bush estimates that DEC will do approximately $650 million in general purpose networking revenue in 1987.

Because of the shrinking profit margins on terminal-to-host networking products, as well as a projected softening in demand as personal computers become the workstation of choice, networking vendors have added greater interconnection capabilities for personal computers.

"If a customer wants to put a PC on the desk and if that vendor doesn't have a PC connectivity product, the vendor may not even get that customer's business," Baldwin said. "Companies that want to connect terminals, PCs, hosts and so on don't want to mix and match with various companies. They want one vendor to do it all."

Doing it all means more than

See **Shift** page 20

### The future of terminal-to-host networks

| | 1987 | 1988 | 1989 | 1990 | 1991 | Average compound growth |
|---|---|---|---|---|---|---|
| Average number of nodes per network * | 7 | 8.5 | 9.0 | 9.5 | 10 | 12.08% |
| Average number of workstations per node | 7 | 6.5 | 6 | 6 | 6 | (4.03%) |
| Number of connected workstations | 2,375,917 | 3,689,815 | 4,876,874 | 6,860,428 | 9,512,804 | 49.42% |
| Average price of workstation connections | $700 | $600 | $550 | $500 | $475 | (9.43%) |

* Nodes are typically terminal servers shared by several terminals.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

**LANMARKS**

**PAULA MUSICH**

## Homespun tech: Wisdom or folly?

In the midst of market consolidation, when pressure to conform to networking standards is squeezing out vendors with proprietary offerings, start-up companies are still announcing proprietary networking products. One such company, Computer Pathways, Inc., recently did this, arguing that its Grapevine network was built from scratch to be easy to install and use. This is either a bold stroke of technical and marketing genius, or it is poorly thought out and destined to become yet another obscure local network.

There is a need for easy-to-use and easy-to-install personal computer networks, but this must be balanced against users' desires for a "safe" networking investment and a future growth path.

Pressure is building for computer vendors that hawk proprietary networking schemes to adopt standards. Apollo Computer, Inc. wisely gave in to that pressure recently in supporting its Domain networking architecture on top of Ethernet, a move that will boost the workstation vendor's growth.

This is because Ethernet is the prevailing network standard in the scientific and engineering environments in which their workstations are used. Apollo was told that a cabling infrastructure using Ethernet's baseband coaxial cabling already existed at customers' sites. Although customers liked Apollo's workstations, they had no room to run another cabling scheme.

This lesson will be repeated in other environments. Here's why. Scientists and engineers led the way when networking was in its infancy. They were willing to experiment with the new technology and found it indispensable. Because Digital Equipment Corp. had a strong presence in this market with a networking product based on Ethernet, this lower level scheme is what pioneer users standardized on. As the level of acceptance of networking in the office environment catches up to the technical arena, standards will again prevail.

Because office computing is not dominated by one vendor, it is likely that more than one lower level standard will predominate. But, prevail they will, and any vendor that doesn't coexist with the standards will not be welcomed into office users' work space.

## NETWORK NOTES

Data Language Corp. of Billerica, Mass., recently announced a data base server for local networks based on its fourth-generation language relational data base management system, Progress.

The server, LAN Progress, is compatible with Network Basic I/O System networks such as IBM's Token-Ring and PC Network, Novell Inc.'s Advanced NetWare and others. The product includes a data base server engine, which controls access to the LAN Progress data base. It also has a fourth-generation language, which allows users to develop multiuser applications.

PC LAN Progress is available now and priced at $2,450.

Hewlett-Packard Co. improved the performance and enhanced the capabilities of its AdvanceLink personal computer-to-minicomputer communications software. It now allows personal computers to back up files on an HP 3000 minicomputer and run host-based graphics applications on personal

See **Network notes** page 20

# Shift to PCs a boon for users

continued from page 19

providing mere terminal emulation to allow a personal computer on the net to access network hosts. "Now users are saying we need personal computer adapter boards, where before it was some kind of terminal interface unit link," Baldwin said.

"The terminal-to-host vendor needs to become a PC LAN vendor and offer departmental networks based on PCs," Baldwin said. "He also needs to have a product connecting the departmental PC network into a backbone for the rest of the network."

Sytek, Inc. is one terminal-to-host vendor that failed to read these requirements and is now suffering as a result, according to Eric Killorin, publisher of "Netline," an industry newsletter. Sytek has recently reported a third-quarter loss, which company officials attributed to weak demand for its asynchronous terminal-to-host networking products.

"The reason they're facing hardships is that terminal-to-host connectivity is the major part of their business," Baldwin said. "Although Sytek participated with a PC line, it was broadband — the old IBM PC Network. For the most part, people are not going to connect PCs with broadband cable."

"Sytek is too focused on broadband terminal-to-host connectivity," said Edward Snyder, general manager for TRW, Inc.'s Information Networks Division. "If you don't offer a broader solution with a future growth path, people feel they're buying into a dead-end product."

> "If you don't offer a broader solution with a future growth path, people feel they're buying into a dead-end product," said TRW's Snyder.

Although not everyone agrees that demand is softening for terminal-to-host networks (TRW is in the process of installing a $100 million broadband terminal-to-host network for the U.S. Air Force), growth is expected to slow as personal computers replace terminals on users' desks. "It's still a fairly decent market, but it is one we expect will soften because people will be putting PCs on their desks in a lot of cases and not terminals," Baldwin said. ◻

**Network notes** from **page 19**

computers. HP AdvanceLink software links HP Vectra and the IBM Personal Computer, as well as the IBM Personal Computer XTs and ATs to HP minicomputers.

HP, based in Palo Alto, Calif., claimed it has doubled the throughput between personal computers and HP 3000 minicomputers over local networks, X.25 wide-area networks and RS-232 lines. HP also said it improved the performance of AdvanceLink's terminal emulation by 25%. The new version of AdvanceLink, part of the firm's Personal Productivity Series of applications, is available now for $325.

Prime Computer, Inc., based in Natick, Mass., recently unveiled an Intel Corp. 80386-based supermicrocomputer that can be configured as an Ethernet file server for MS-DOS- and Unix-based machines. The EXL 316, which runs Prime's implementation of Unix System V.3, will be offered with Locus Computing Corp.'s Merge 386 and PC-Interface software to allow IBM Personal Computers and compatibles to access the supermicrocomputer as a file server.

The EXL 316 can also communicate with Prime Series 50 superminicomputers and other machines using Transmission Control Protocol/Internet Protocol networking software. Prime will also offer Systems Network Architecture internetworking through a licensing agreement with the Orion Group, Inc. Prime will license Orion's sna62 Peer Communications Facility, sna0123 Facility and 3270 and 3770 MicroNode terminal-emulation products to allow peer-to-peer and 3270 internetworking.

A standard configuration for the supermicrocomputer that includes the Unix operating system, 2M bytes of memory, 90M bytes of disk storage, a 60M-byte streaming tape backup subsystem and 10 asynchronous lines is priced at $23,900 and will be available in June.

Tekelec, Inc. of Calabasas, Calif., introduced an Ethernet bridge that links geographically separate Ethernet networks over one or two synchronous links at 64K bit/sec or over four synchronous links at 4.8K or 9.6K bit/sec. The Total Access Network System bridge, which consists of two communications processors and software, connects Ethernet and thin Ethernet networks. It is priced at $12,500 and is available now. ◻

Play it again, Sam

Here's your chance to catch a classic — Communication Networks '87 sessions on audio or video tape!

**New in 1987**

CW/Conference Management Group offers their educational sessions on video or audio tape. This is what one attendee had to say about Communication Networks '87 sessions. "I think CN is wonderful. It provides an opportunity to get a myriad of professional expertise and advice in many different areas within communications."

Now it's your chance to get in on the action. Here are some of the telecommunication tapes you can benefit from:

**Strategic Business Perspectives Series**

These tapes offer a perspective for senior management on major shifts in the telecommunications industry and their business implications, covering breakthrough technologies, significant market realignment and the new networking environment.

**Town Meeting**

Modified Final Judgement — antitrust settlement impact on the telecommunications industry after five years. Peter Huber along with the representatives of the principal participants in this area will give their views on the beneficial and detrimental effects of the MFJ.

**Who's in the Hot Seat**

The communications industry's favorite pundit, Harry Newton, is in the "Hot Seat"! Listen to him field questions and answers in the way only he can.

You can choose from more than 80 audio taped and 10 video taped CN'87 conference sessions. The sessions are professionally produced to broadcast standards.

To receive prices and a complete listing of available cassettes simply fill out the coupon and mail it to: CN'87 Tape Center, Communication Networks, P.O. Box 9171, Framingham, MA 01701-9171.

Yes, I'm interested in receiving more information on Communication Networks '87 audi/video tapes.

Name ____________________

Title ____________________

Company ____________________

City/State/Zip ____________________

Telephone ____________________

NWW2

# COMMUNICATIONS MANAGER

> “ Members of three groups should possess strategic information system vision: top management, line management and information management. Top management because their task is to set the firm's strategic direction. Line management because their functions are in closest contact with the firm's strategic targets. Information management needs it because they must assess the strategic significance of new technologies.
>
> **Charles Wiseman**
> From *Strategies and Computers*
> Richard D. Irwin, Inc.

*MANAGEMENT SURVEY*

## Users tell how to plan applications

*Patterns of strategic planning vary.*

**BY BOB HAMEL**
Senior Editor

When it comes to the issue of developing strategic communications applications for competitive gain, there appears to be no pattern of responsibility for creating the application.

In some cases, senior management dictates its strategies to departmental managers, or lower level managers may “sell” their concepts to the executive powers. In other cases, teams comprising all management levels and corporate departments may hammer out the details together.

After questioning a number of communications managers, *Network World* found that the ways in which companies develop strategic applications are as diverse as the many methods of management.

### Starting at department level

For Douglas Dykes, the creation of strategic applications begins at his department level. The modus operandi involves translating technical applications into business objectives, which are then included in the division's overall planning.

Dykes is a telecommunications manager for information management services at Minneapolis-based Honeywell, Inc. He and his department have their plans included in corporate strategic planning.

“My strategies, objectives and capital plan are incorporated into the division's plan, which is rolled into the overall corporate plan,” he said. “Once the plan is approved, my department and senior management can plan ahead and know what's coming down the road.”

Dykes said the relationship between senior management and the department is ideal. “It's not an us-vs.-them relationship,” he said. “It's more discussing an idea and exploring the possibilities.” He tailors his presentations to a subject familiar to management: business.

“We talk in terms of what the business objectives are, what the payoff to the business is in developing a specific application,” he said. “As far as technology goes, you can't put in technology for technology's sake. You have to ap-

See **Users** page 23

**Creating and implementing a strategic application**

- Define the application.
- Determine the communications technologies involved.
- Investigate available products to meet technological needs.
- Present business plan outlining costs and benefits of application to senior management.
- Develop pilot program to test application.
- Test and evaluate application.
- If needed, modify and enhance application.
- Implement technology on production scale.

SOURCE: NETWORK WORLD

*HIGH-TECH ROUNDTABLE*

## CEOS meet to discuss world trade

**BY BOB HAMEL**
Senior Editor

LOS ANGELES — In order to promote the exchange of ideas and information among leading chief executive officers in technology industries, the World Technology Executives Network (WorldTEN) recently held a roundtable discussion concerning U.S.-Japanese manufacturing relations.

According to Larraine Segil, chairwoman of WorldTEN, the international organization was formed “to bring decision-makers together to exchange business perspectives, overcome barriers and misunderstandings, and to directly explore mutually beneficial joint ventures.”

In the organization's first roundtable discussion, Segil said the discussions focused on joint ventures between Japanese and U.S. manufacturers and how those relationships will have to be restructured. “The consensus is that more manu-

See **CEOs** page 22

GUIDELINES

**ERIC SCHMALL**

## A lesson from military history

The 19th century Prussian army, which taught the world a thing or two about effective organization, would not allow any officer to be considered for a general staff position unless the candidate had successfully served in a line position through two promotions.

Only then would the individual have an appreciation of the line experiences a staff officer needed to support line units. The wisdom of this policy shouldn't be lost on communications departments that are setting up staff sections — such as research — that support line operations.

Establishing a staff unit that is isolated from direct line functions has a lot of merit for mature organizations. It allows such activities as research or planning to proceed unhampered by the demands of the constant brushfire wars a line manager faces. It focuses on strategic issues and allows for clear review of options. Many organizations, however, make a fatal error in not allowing former line managers to head up these staff positions.

Someone who has survived the harrowing experiences of implementing, managing and maintaining communications systems brings several advantages to the staff function. First of all, he knows from his former responsibilities what the critical needs of research and development are. He knows the concerns of his former staff and users' needs.

Secondly, this manager will not be easily misled by the slick promises of vendors' glossy documentation proposing magic solutions to complex problems. He is a hard-boiled realist who refuses to climb into an ivory tower. He is not likely to betray his former staff by proposing improbable procedures, unworkable systems or abstract remedies.

Finally, he will have the time to develop a refined appreciation of what really does exist out in the industry and what his organization's strategic needs are. This broadening activity will enhance and round out his overall managerial talents.

Where once, as a line manager, he was more concerned with tactical issues, he now appreciates the strategic view. In his earlier life he was primarily involved in giving direction; now he is more intimately involved in planning and communicating. The result for the organization is a staff section firmly rooted in support of the line units and a vehicle for developing managers to their greatest potential.

*Schmall is network systems manager for an insurance holding company.*

## ASSOCIATIONS

Ray S. AbuZayyad, the new president of Rolm Corp., will address the National Rolm Users Group at its general membership meeting, to be held in conjunction with the International Communications Association (ICA) Exposition in New Orleans, May 17 through 22. AbuZayyad will speak on May 19 at 2 p.m. in Room 40 of the New Orleans Convention Center. The meeting will be open to Rolm users and ICA members interested in hearing about Rolm's future direction.

The National Computer Graphics Association (NCGA) of Fairfax, Va., will hold a management briefing on the relationship between computer graphics standards and Manufacturing Automation Protocol and Technical and Office Protocol on June 17 at the Holiday Inn O'Hare Airport Hotel in Chicago. The briefing is sponsored by the NCGA's corporate advisory board.

The briefing will focus on the role of computer graphics and standards in computer-integrated manufacturing, and it will feature a discussion on current trends in

See **Associations** page 22

"I need a LAN that installs easily and quickly."

"I need 10-NET."

10-NET gets you up and running faster than any other high-end LAN. Inexpensive, and easy to expand or relocate, 10-NET uses simple, twisted pair wiring, but operates with all the speed of networks that use expensive coax cable.

Once you add up 10-NET advantages, you'll see why over 50,000 installations are already in place worldwide.

A phone call gets you the facts. Call:

1-800-358-1010.

In Ohio call 1-800-782-1010. Telex 650-2079125

FOX®

Fox Research, Inc. • 7016 Corporate Way • Dayton, Ohio 45459

10-NET is designed for use with IBM PCs, ATs and compatibles.

See us at COMDEX/Spring, Booth #2916

10™ NET
LOCAL AREA
NETWORK SYSTEM

More than just talk.

## SEMINARS

On June 11 and 12, a two-day conference addressing trends in international communications services will be held at the Westin Hotel in Washington, D.C. The conference will discuss competition and new services and present the commercial outlook for new international data, voice, video and private-line services.

In addition, setting up new services with foreign telecommunications administrations and Communications Satellite Corp.'s future role in international satellite communications will be featured. Former Federal Communications Commission Commissioner Henry M. Rivera will chair the conference, and Gary M. Epstein, former FCC Common Carrier Bureau chief, will serve as moderator.

The June 11 session will focus on the prospects for direct access to International Telecommunications Satellite Organization by carriers other than COMSAT. Additional topics to be covered include the role of COMSAT as offical U.S. representative to INTELSAT and COMSAT's plans to offer competitive retail international services.

The second day will feature a discussion on the posture of foreign telecommunications administrations toward competition and new entrants, and the practical aspects of negotiating operating agreements. Doing business abroad will also be examined.

The conference fee is $695 per person. For additional information or to register, call the Telecom Conference registrar at (800) 327-7205, or in the Washington, D.C. area, call (703) 683-4100.

**Associations** from **page 21**

graphics, graphics application and data exchange standards as well as systems integration.

Complete program information is available from the NCGA's corporate activities department and can be obtained by calling (703) 968-9600.

The International Communications Association (ICA) will hold a summer program from June 14 through June 19 at the University of Colorado at Boulder, entitled, "T-1 Networks and T-1 Multiplexing."

The first day of the five-day program will cover T-1 concepts, media characteristics and network hardware.

On day two, speakers will discuss T-1 multiplexer concepts and T-1 multiplexer selection criteria. In addition, a presentation on cost-justification for using T-1 will be featured.

On the third day, lecturers will discuss T-1 circuit engineering and T-1 carrier formats. Fourth-day classes will cover performance measurement and error detection as well as T-1 multiplexer networking.

Case studies concerning the economics of T-1 and the realities of installing T-1 networks will be presented on the fourth and fifth days.

A panel discussion concerning the future of T-1 technology, products and customer use will also be presented. The panel will feature Robert Hinkleman, district manager/networks for AT&T, Walter Gill, vice-president of engineering, Network Equipment Technologies Co., Joel Engle, vice-president of research, MCI Communications Corp., John Eddon, vice-president of marketing, Timeplex, Inc. and Dale Hatfield, president of Dale N. Hatfield Associates.

For further information, contact Jim Weinstein at the ICA office at (214) 223-3889.

## CEOs meet

continued from page 21

facturing will have to be brought into the U.S., as opposed to what's happened in the past," Segil said.

Albert Wong, co-founder and executive vice-president of AST Research, Inc., of Irvine, Calif., said "State-of-the-art technology and market opportunities are increasingly found outside the U.S., yet most American companies do not accept this or know how to deal with it." Wong stated that success in foreign markets means a company must prove it can solve a problem. "It's not just a matter of porting technology overseas," he added.

"The whole concept behind WorldTEN is to have small roundtable discussions of 20 to 30 CEOs who would not normally sit down with each other," said Segil. She stated that since most of the participants belong to their own focused trade associations, the contact they receive here is different. "For example, a biotechnology manufacturer can sit down with a telecommunications manufacturer, a computer software/hardware manufacturer and a missile manufacturer, and although the product issues are different, there's a lot to be gained in cross-technological information," she said.

On the organization's agenda are roundtable discussions in Boston (June 24-26) and in Osaka, Japan (Oct. 4-10). WorldTEN will use the roundtable format to discusss such issues as finding new sources of financing, managing joint ventures, gaining market advantage, choosing worldwide market niches and selecting the appropriate people and resources.

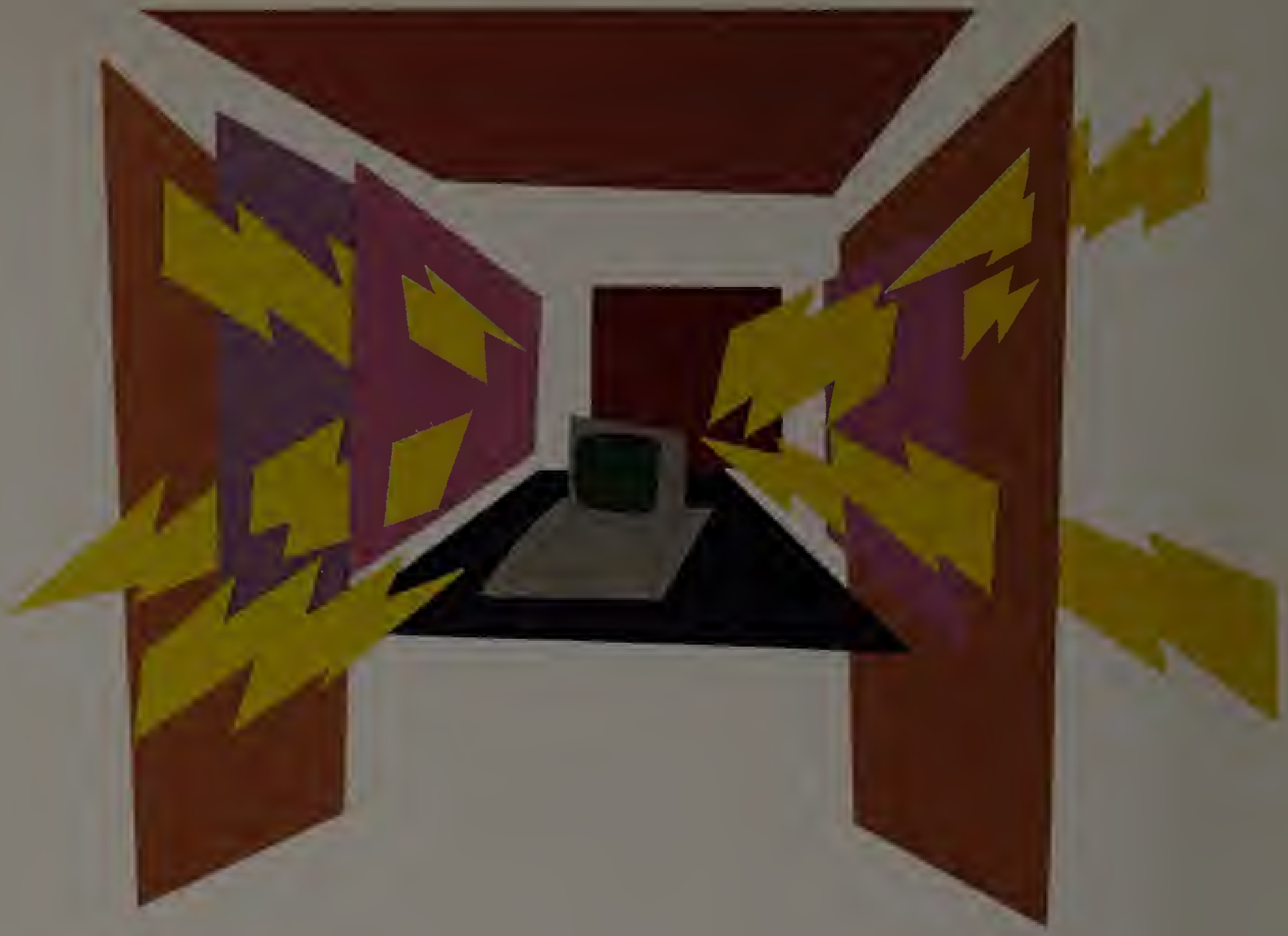
According to Segil, CEOs and decision-makers in technological companies with between $3 million and $700 million in revenue or assets may join the organization. Membership is also available to executives of divisions in large international corporations "who are concerned with strengthening their competitive edge through technology."

Special Advertising Supplement

Reprinted from the April 20, 1987 issue of FORBES

Forbes

# Linking Computers & Communications for the Smart Office



# Linking Computers & Communications for the Smart Office

The phenomenon is now well charted. The rate at which digital devices—personal computers, terminals, word processors, "smart" phones, and specialty devices like facsimile machines and stock quotation terminals—are streaming into the white-collar workplace is known to the second decimal place.

What's not well charted, however, is exactly how all these things will interact with one another, exactly how the flavors will marry in this digital brew.

Look at the lengths to which office furniture designers have had to accommodate keyboard Fridays, the way vendors like IBM and AT&T have found themselves in the building cabling business, the relative ease with which telephone switches can control building lights and power. All represent directions not foreseen in 1940 when the first data transmission took place, in 1964 when the IBM mag card typewriter launched the era of modern office automation, or in 1975 when the first personal computer appeared in kit form on the cover of *Popular Electronics*.

This White Paper to Management, prepared for FORBES by International Data Corporation, examines the office automation phenomenon from its far side—as practitioners seek and begin to find higher levels of integration. Up to and including the very buildings in which automation takes place.

### The Challenge of Systems Integration: Harnessing Change

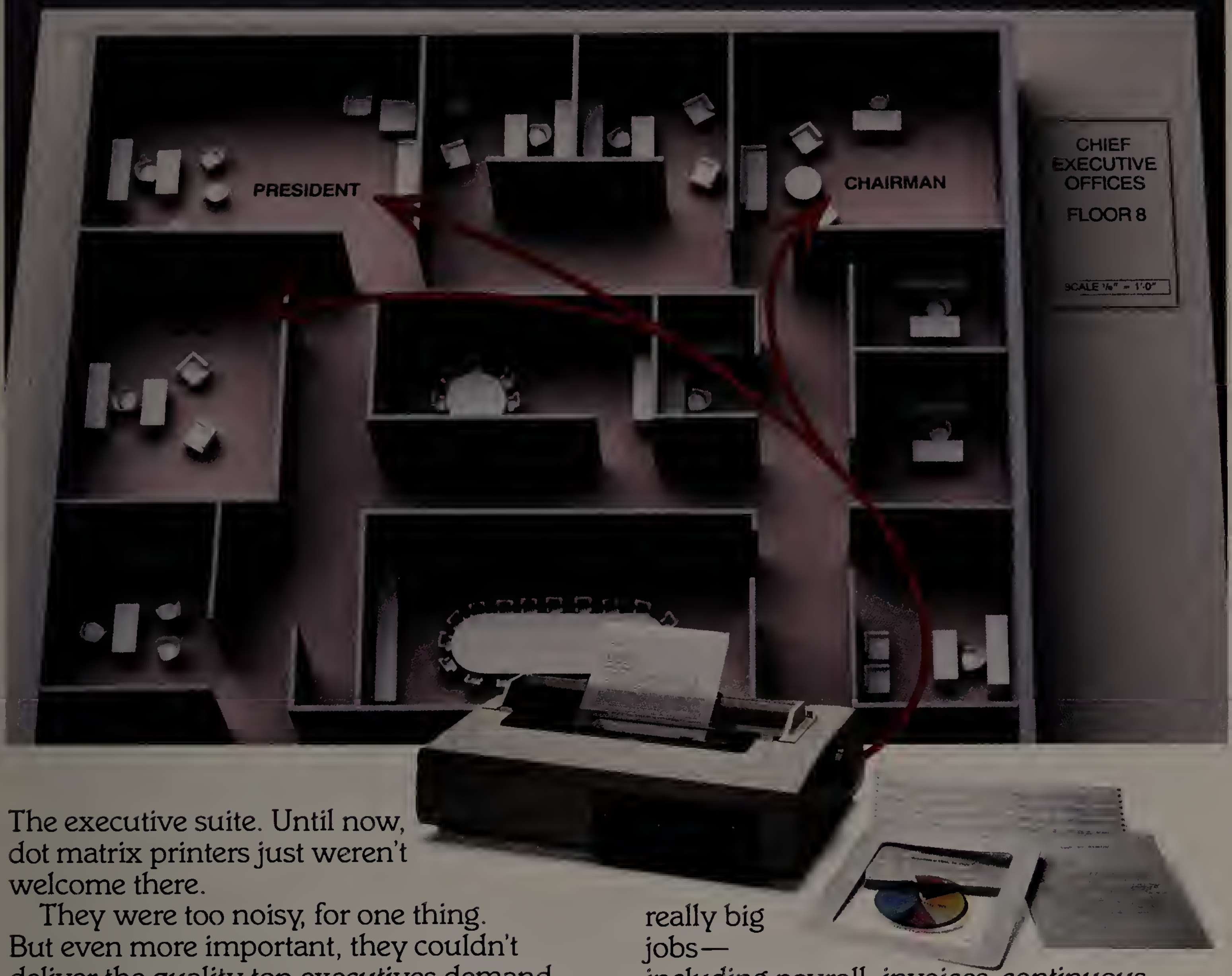
What makes the cycle—environment adjusting to automation adjusting to environment—so opaque is the speed with which everything takes place. Some examples:

- In 1980 there were less than 4 million electronic keyboards in offices in the U.S. By 1990 there will be almost 50 million.
- In 1980 digital telephone switches were a rarity, digital telephones even rarer. By 1990 almost all switches shipped will be digital and have provisions for switching data traffic, and the telephone companies will be well into marketing the integrated services digital networks (ISDN) now in pilot phase.
- In 1980 the concept of "intelligent" building had yet to be set in concrete and steel; today the second generation of the genre is already in sight.

Add to the permanent state-of-flux brought to the market by continual technology advance some larger socio-political changes—the deregulation of basic industries and the breakup of AT&T—and you add even more unknowns into the equation of automation.

This makes the challenge of systems integration all the more difficult. It's one thing to link disparate systems—say energy management and telecommunications—into an integrated entity. It's quite another to do it when subsystem technologies advance at different, but lightning-fast, speeds.

# OUR NEW PINWRITER XL SERIES BOLDLY GOES WHERE NO OTHER MATRIX PRINTERS HAVE GONE BEFORE.



The executive suite. Until now, dot matrix printers just weren't welcome there.

They were too noisy, for one thing. But even more important, they couldn't deliver the quality top executives demand.

But now there's the XL series from NEC.

Our Pinwriter® XL series printers have multistrike film ribbons that produce true letter-quality documents—the kind any executive would be proud to sign. They print in 8 different colors—on paper or transparencies—to make charts, graphs and executive presentations more impressive. And they're the quietest matrix printers you've never heard.

`Dear Stockholder:`

Actual print sample from a Pinwriter P9XL printer.

They're also fast. Take our new Pinwriter P9XL, for example. It's over 30% faster than most other printers in its price range, with nearly twice as much memory to handle the really big jobs—including payroll, invoices, continuous forms, and multi-page reports.

Executives will also be pleased to learn that the Pinwriter XL printers, like all NEC printers, are built to run an average of 5 years before they might need a repair. In fact, they have the highest reliability ratings in the industry.

So make an executive decision. Call 1-800-343-4418 (in MA 617-264-8635) and ask for the name of the NEC dealer nearest you. Or write to NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

**NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.**

C&C Computers and Communications

**NEC**
NEC Information Systems, Inc.

## The Merging of Computing and Communications

The two technologies used to be as different as their ubiquitous symbols, the telephone pole and the punched card. One discipline began as a way to use machines to replace humans at adding machines calculating bomb trajectories, the other as a method to compete with telegraph in long distance communications.

In the post-World War II era, however, as a result of the invention of the transistor and its implementation in solid state circuitry, the technologies began a relentless march to the same sea. Both are now headed for an all-digital (it's cheaper than analog), highly interconnected environment—the perfect setting for conducting the information passing of a post-industrial world.

Until recently, this merger of communications and computing was more talked about than realized. IBM didn't really compete with AT&T in any core markets, telephone system managers had little concourse with data processing staffers. The technology was lagged by immense infrastructures that had to reposition themselves and by users puzzling over how to manage the merged activity.

But the time has finally come. Some signs that this merging has progressed enough that it makes sense to consider communications and computing as one and the same:

- Over half the corporate telecommunications departments in the U.S. are now jointly managed with data processing departments, according to surveys conducted by *Telecommunications Products + Technology* magazine, a monthly trade publication.
- Most telephone private branch exchanges (PBXs) and key telephone systems being shipped now are digital and have data switching capability; by 1990 enough will have been shipped that over half the installed base of PBXs and key systems will be digital.
- Not only are the major vendors—like AT&T, IBM, NEC, Wang, Toshiba, and others—now selling both telephone systems and computers, but the same distribution channels are beginning to move both types of product. Tandy, for instance, sells both computers and key systems to small businesses through its stores.
- The most sophisticated of office automation systems now offer the capability for voice annotation of documents. And companies like Wang, that grew up in the word processing business, now also sell voice mail systems, telephone switchboards, and networking services.
- While most personal computers (80%) in 1985 operated in stand-alone mode, by next year most (70%) will either be connected to a local area network or be part of a distributed information processing environment in which it is necessary for PCs to access host computers.

## The Vendors React to Colliding Markets

As the technologies of communications and computing merge, and as corporations merge their managing departments, vendors have also reacted. The big signs—AT&T's divestiture and run at the computer business, IBM's acquisition of Rolm—have been well reported.

But the little signs are there, as well.

Companies like Tandy and Toshiba find their laptop computers are used extensively as portable order entry terminals for salesmen and electronic mail terminals for executives on the road. NEC discovers that it can operate its own systems—APC III personal computers linked through a NEAX2400 IBM PBX to NEC mainframes—at its corporate office in Melville, NY. The PBX there, by the way, manages both electronic (text) mail and facsimile distribution throughout the facility.

Meanwhile, Wang Laboratories finds itself migrating quite naturally from its

### When the Buildings Themselves are Brainy

Office automation used to be an activity that took place in a more or less hostile environment. Modular office furniture didn't used to have conduits for computer cables; the backbone cabling for local networks would have to fight for space in elevator shafts, and moving or installing new computers would require enough destruction of sheetrock to make it easier to move people than computers.

What's more, most office complexes had myriad information processing systems—one for security, which might or might not include closed circuit TV, one for environmental control, one for elevator management, one for the lighting control, and however many for computing and telephones as there were tenants.

But by the late 1970s there was enough office automation in place to inspire the concept of the "intelligent" building—edifices to be designed from the ground up with the electronic needs of its tenants in mind. The economies of scale of sharing large telephone switches among tenants and prewiring computer cabling alone began to look attractive, not to mention the advantage of using digital computers to control environmental systems.

The first generation buildings are already in place, like Chicago's 1 Financial Place, a showplace environment created and maintained by Johnson Controls, one of the leaders in advanced systems for facilities management. These buildings generally offer both fully computerized building management systems and digitally switched telecommunications.

Next generation intelligent buildings will provide more integration between building management systems, backbone communications and signal switching, and tenant owned local data processing and voice networks. When the telephone companies bring their concept of Integrated Services Digital Networks (ISDN) onstream in force in the 1990s it will be significantly easier to provide such background service in the facilities themselves.

"I was giving a seminar on network management in Atlanta. My topic was making SNA work without IBM. Anyway, the room was filled with MIS guys who didn't believe it could happen and they wondered why I was there. And so I showed them it has happened with one of the biggest SNA networks in the world and I spelled it out. No IBM mainframe...no IBM controllers...no IBM screens on the desks...no IBM iron anywhere. What's there instead? In the center, five IBM look-alike mainframes and a Wang VS. Plus, a VS computer at each node... hundreds of them ... and thousands of our workstations...covering the whole country. **One network. And the whole thing...the entire network...managed by the Wang VS—I didn't even have to talk to them about all the applications they were running. I just said, 'This, ladies and gentlemen, is how Wang can make standards work for you and bring your network alive today.'** AND...blink...blink... blink. I could practically see the lightbulbs go on over their heads."

WANG MAKES IT WORK.

Give us a day to make it work for you. At the Wang Executive Briefing Centers you can have a customized demonstration, showing how Wang can make your computers and your business work better. Now and in the future. You can also see additional examples of how Wang made it work for other companies. Call **1-800-522-WANG.** © 1987 Wang Laboratories, Inc.

office automation product base to the provision of shared tenant services—anchored around word processing and telephone access—at half a dozen Washington, DC sites. And Johnson Controls finds itself a leader in a business that suddenly has to know as much about software development—since software runs the computers that control the building systems—as it does about heating, lighting, and security systems.

### In-House Communications: View through a Kaleidoscope

Most office automationists will tell you that the bulk of corporate information passing takes place at the local level—whether it's a matter of dropping memos off on the desk next door or access computer data files.

Until recently, there were three separate network genres in most offices—one for the phones, one for computers, and one for environmental control. And each genre supported multiple subsystem types.

The least integrated and standardized of these network types is that for computers. Even now the communications alternatives are diverse, encompassing:

- Mainframe control of data communications and access by "dumb" terminals,
- Departmental computing on multiuser systems, often with distributed applications and gateways to other networks,
- Application-specific networks with tightly coupled communications, such as that required by clustered word processing systems or the new computer-aided design systems,

- Large-scale local area networking supporting perhaps hundreds of terminals, computers, and workstations,
- Application-specific—but general-purpose local networking—such as corporate videotex,
- Smaller-scale local networking for sharing printers, disks, and data files between handfuls of personal computers,
- Shorthaul data communications via special data-only switchboards,
- Local data switching through PBXs or key systems, and
- Local data communications routing through telephone company central offices.

Because of the way computer applications have grown up, most corporations already have multiple network types in place. And why not? The applications themselves were justified, and often the most logical communications support was selected.

Users have discovered, however, that there are economies to be had in at least seeking to share some common facilities for separate networks. Some trends:

- Major computer and telephone system manufacturers now support common cabling schemes for buildings—where wires run once in a building support both computer and telephone traffic. Initial cabling hardware and installation costs may be higher, since capacity must be installed to lie fallow until future applications come on-line, but savings in rewiring costs to support moves and changes can rapidly make up the difference.
- Local area network vendors are finding ways to send their signals over the installed telephone wires rather than coaxial cables installed separately.
- Equipment vendors are building interfaces directly into their products to make it cheaper and easier to connect them to local area networks.
- The ISDN concept mentioned before is designed to allow two telephone calls and one data transmission to run over the wire that today handles a single call.

Meanwhile, one of the fastest growing sectors of in-office automation is the market for local area networks. According to International Data Corporation, the total number of LANs installed worldwide in 1986 was 144,000, supporting 2.5 million workstations. By 1991 the installed base will rise to over 800,000 and support over 17 million workstations. A market growing even faster—albeit from a smaller base—is that for products that link multiple LANs together.

### Making the Environment Itself Intelligent

At this point, there is nothing inherent in the technology to prevent ever further outward integration of computing and communications function.

Indeed, one area in which we are already seeing it is in the merging of building management and shared tenant serv-

### Chase Manhattan: Fax for Documents That Leave the Building

Office automation hasn't cut the paperwork involved in modern commerce, simply computerized its production. For a bank the size of Chase Manhattan, which processes three million checks and $120 billion a day, daily business means controlling a ceaseless flow of documents.

Much of that document flow is to and from the bank's own international facilities—enough that the bank constructed its own internal facsimile network to service its eight most paper-intensive locations. The company's legions of fax machines include over 400 NEC units at U.S. and international offices.

The justification for fax was easy—the bank is already saving $500,000 a year in delivery and electronic mail charges since installing its fax operations. And internal mail delivery has been speeded up from days to hours.

But there is a longer term justification at work as well—sooner or later the bank will integrate fax with its office automation systems; one study team is already exploring ways to tie fax in with local area networks.

It won't happen overnight. But facsimile transmission—a mostly digital process these days—is a better springboard for electronic transmission of compound (text, data, graphics) documents than most other communication technologies because of the ability to ship images. Many fax machines already have significant computer control; some can even accept direct computer input or operate as telex terminals.

4/20/87 Issue

## Linking Computers and Communications for the Smart Office

150. Johnson Controls Inc.
151. NEC America Inc.
 Corporate Marketing
152. NEC Information Systems
153. Toshiba America Inc.
 Information Systems Division
154. Toshiba America Inc.
 Telecommunication Systems Division

TITLE (PLEASE CHECK)

A ☐ Chmn of the Bd/Directors
B ☐ President
C ☐ Vice-President
D ☐ Treas/Controller/Secy.
E ☐ Owner or Partner
F ☐ General Manager
G ☐ Div., Dept. & Other Mgmt.
H ☐ Office Systems & D.P. Mgr.
I ☐ Purch. Dir. or Mgr.
J ☐ Other________

Name ____________________
Company ____________________
Address ____________________
City __________ State ______ Zip ______
Phone ____________________

Offer expires August 10, 1987

R

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 217 CLINTON, IA

POSTAGE WILL BE PAID BY ADDRESSEE

Forbes
P.O. BOX 2734
CLINTON, IA 52735

## For fast, FREE information from advertisers in this section call toll-free:

**1-800-843-8747**
**(call between 7am and 9pm EST)**

**Or circle the number of each company you would like to know more about listed on the postage-paid card and mail today.**

4/20/87 Issue

### Linking Computers and Communications for the Smart Office

150. Johnson Controls Inc.
151. NEC America Inc.
Corporate Marketing
152. NEC Information Systems
153. Toshiba America Inc.
Information Systems Division
154. Toshiba America Inc.
Telecommunication Systems Division

TITLE (PLEASE CHECK)

A ☐ Chmn of the Bd/Directors
B ☐ President
C ☐ Vice-President
D ☐ Treas/Controller/Secy.
E ☐ Owner or Partner
F ☐ General Manager
G ☐ Div., Dept. & Other Mgmt.
H ☐ Office Systems & D.P. Mgr.
I ☐ Purch. Dir. or Mgr.
J ☐ Other

Name

Company

Address

City State Zip

Phone

Offer expires August 10, 1987

R

**For fast, FREE information from advertisers in this section call toll-free:**

**1-800-843-8747**

(call between 7am and 9pm EST)

**Or circle the number of each company you would like to know more about listed on the postage-paid card and mail today.**

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 217 CLINTON, IA

POSTAGE WILL BE PAID BY ADDRESSEE

Forbes
P.O. BOX 2734
CLINTON, IA 52735

# You go further when you take your office with you.

# The T3100. AT Power, Toshiba-Style.

Until now, working away from your office meant having to settle for a lesser computer—or no computer at all. Toshiba ends that compromise. The T3100 delivers the power of an IBM® PC AT™ in a lean, 15-pound computer that you can take with you. Not only is this the most handsome machine to ever sit on a desk, its full-sized keyboard and advanced gas plasma display are designed for equal comfort and clarity in your office—or on the road. You enjoy the productivity gains of a built-in hard disk, communications and expansion options, and more—including dual-voltage power that lets you plug in and go to work just about anywhere in the world.

Clearly, not just a better portable: This is a computing tool so powerful, it's like taking your whole office wherever you work.

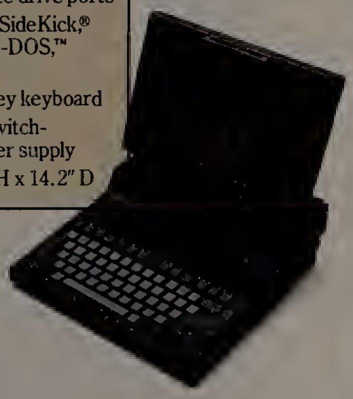
See the system that has all of the industry experts so excited. Call:

**1-800-457-7777**

for your nearest Toshiba computer and printer dealer.

**All this—and only 15 pounds!**

- IBM PC AT compatible
- 80286 processor, running at 8MHz
- 640KB RAM, extendable to 2.6MB
- Built-in 10MB hard disk
- Built-in 720KB 3½" diskette drive
- High-resolution gas plasma display
- IBM Color Graphics Adapter (CGA) compatible
- 80 x 25 character display
- 640 x 400 bit-mapped graphics display
- RGB, parallel, serial and external diskette drive ports
- Carrying case, SideKick,® SuperKey,® MS-DOS,™ included
- Full-sized 81-key keyboard
- 110/220 VAC switch-selectable power supply
- 12.2" W x 3.1" H x 14.2" D



In Touch with Tomorrow

**TOSHIBA**

TOSHIBA AMERICA, INC., Information Systems Division

Trademarks: PC AT—International Business Machines Corporation; MS-DOS—Microsoft Corporation. Registered Trademarks: IBM—International Business Machines Corporation; SideKick, SuperKey—Borland International, Inc.

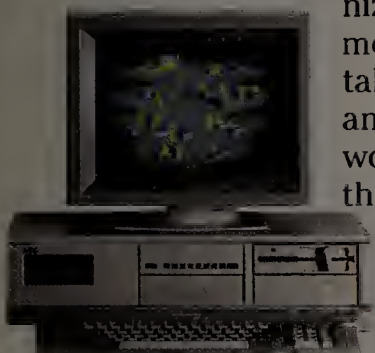
# "It's easy to get the
to play together,

Casey Stengel

© 1987 The Casey Stengel Estate under license authorized by Curtis Licensing, Indianapolis, IN

# players. Gettin'em that's the hard part."

## Unity from NEC: Casey would have called it, "Amazin'!"



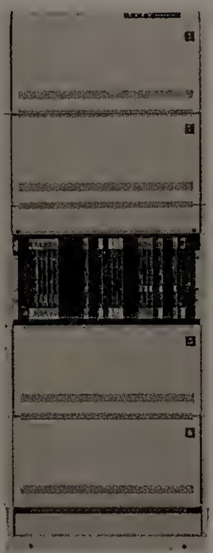
If Casey had managed information instead of a baseball team, he'd have looked to NEC for help. Because at NEC we recognize that building the most productive business takes more than computers and communications working alone. You need them working together.

That's when you get true championship performance.

That's the concept we call C&C, and it's one of the reasons why our remarkable NEAX 2400 Information Management System is more than a powerful digital Private Branch Exchange. It works to unite your office equipment into a totally integrated system.

Its voice, text, image and data capabilities allow you to build a system to your own design.

Voice and data capabilities are further enhanced when you connect the NEAX 2400 IMS to D^term^ digital telephones and the exciting APC IV computer—add to this our intelligent BIT Series of fax terminals and suddenly everything in your office starts to play together better than ever before. And the APC IV, with its perfect blend of compatibility and power, can run all the most popular software.



Every NEC product is a strong individual performer. Working together, they're even better. And they also interface smoothly with other suppliers' equipment, so it's easy to form the exact system you need.

And like Casey, we don't just believe in performance, we back it up with leadership on every level: from supercomputers to global communications networks made up of fiber optic, microwave and satellite transmissions. No other supplier can match our broad and balanced knowledge in computers and communications.

Let NEC help make your business more productive and efficient. Give us a call to find out more about our wide range of products and systems.

**NEC America, Inc.**
**Corporate Marketing**
**8 Old Sod Farm Road**
**Melville, New York 11747**
**Telephone: 1-800-626-4952**
**(in NY 1-516-293-3015)**

NEC

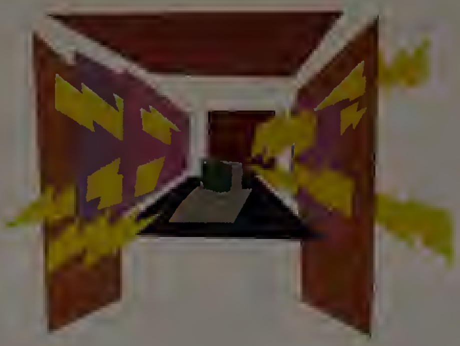
C&C
Computers and Communications

ices—the so-called "intelligent" buildings where tenants share not only heat, light, transportation, environmental controls, and building management (computerized), but also telecommunications switches, computer cabling, satellite dishes, and even computers themselves.

Two driving forces are behind this concept of the intelligent building:

- Computer-controlled building management. The building controls business has been no less immune to digitization than other activities, and the result has been a general integration of fire protection, security, energy management, and environmental control into a single, computer-based system operating over a single wiring system. Sensor-based, computer-driven control of heating systems, for instance, can cut up to 40% off energy bills by turning off thermostats when no one is in the room. Less quantifiable savings—but potentially more significant—are those that result from better system operation during emergencies.
- Fourth generation PBXs. The newest generation PBXs, like NEC's NEAX2400, have enough programming oomph to permit the kind of complex switching and administration needed to allow tenant sharing of telecommunications switching and high speed lines. Economies of scale are such that, according to NEC estimates, unrelated businesses sharing telecommunications services can cut 30% off their phone bills.

The first generation of intelligent building had both computer-controlled building management and shared tenant communications—but didn't integrate the two.



But the technology will continue to march ahead. PBX vendors are already offering environmental monitoring and control packages for their switchboards, for instance, and the building management vendors are clearly aware of the in-building transmission needs of their tenants. And they wouldn't mind getting more mileage out of the computers they use to run their building management systems, either.

### The Computer as Peripheral

From the data processing and office automation side of the marriage, the joining of technologies has had a profound impact.

*One.* The networks themselves are becoming the processing entity, with computers acting as network servers and processing nodes. Information transfer and dissemination has become more important than information processing.

*Two.* Connectivity—the ability of devices to talk to each other—has become more important to users than the individual processing capabilities of the devices themselves.

*Three.* Data processing managers are spending more time than ever before worrying about networks than practicing classic computer science.

In the ultimate scenario, of course, it is all integrated. The network is so intelligent that its users can be imprecise in making their demands of it, and interfaces will be so standardized that anything can plug into anything. Luckily we aren't there yet. It's tough enough understanding the opportunities inherent in discrete technologies or in systems that integrate only a few of them at a time. Successive waves of integration at a pulse that is too rapid would present us with so much flexibility that we'd as likely be paralyzed as pleased.

It's happening fast enough as it is.

LINKING COMPUTERS & COMMUNICATIONS FOR THE SMART OFFICE was prepared by International Data Corporation (IDC), Framingham, MA, which is solely responsible for its contents, under the direction of Joseph L. Levy and John Gantz. Graphics: Gael Burns.

Other White Papers to Management to be published in 1987:

June 29—COMPUTER SYSTEMS & SOFTWARE FOR BUSINESS AND INDUSTRY. Ads close May 4.

September 21—TRENDS IN COMMUNICATIONS: NETWORKS FOR TOMORROW. Ads close July 27.

October 19—OFFICE AUTOMATION & DESKTOP COMPUTING. Ads close August 24.

IDC

### Networking Cuts Costs for Blue Cross/Blue Shield of Maryland

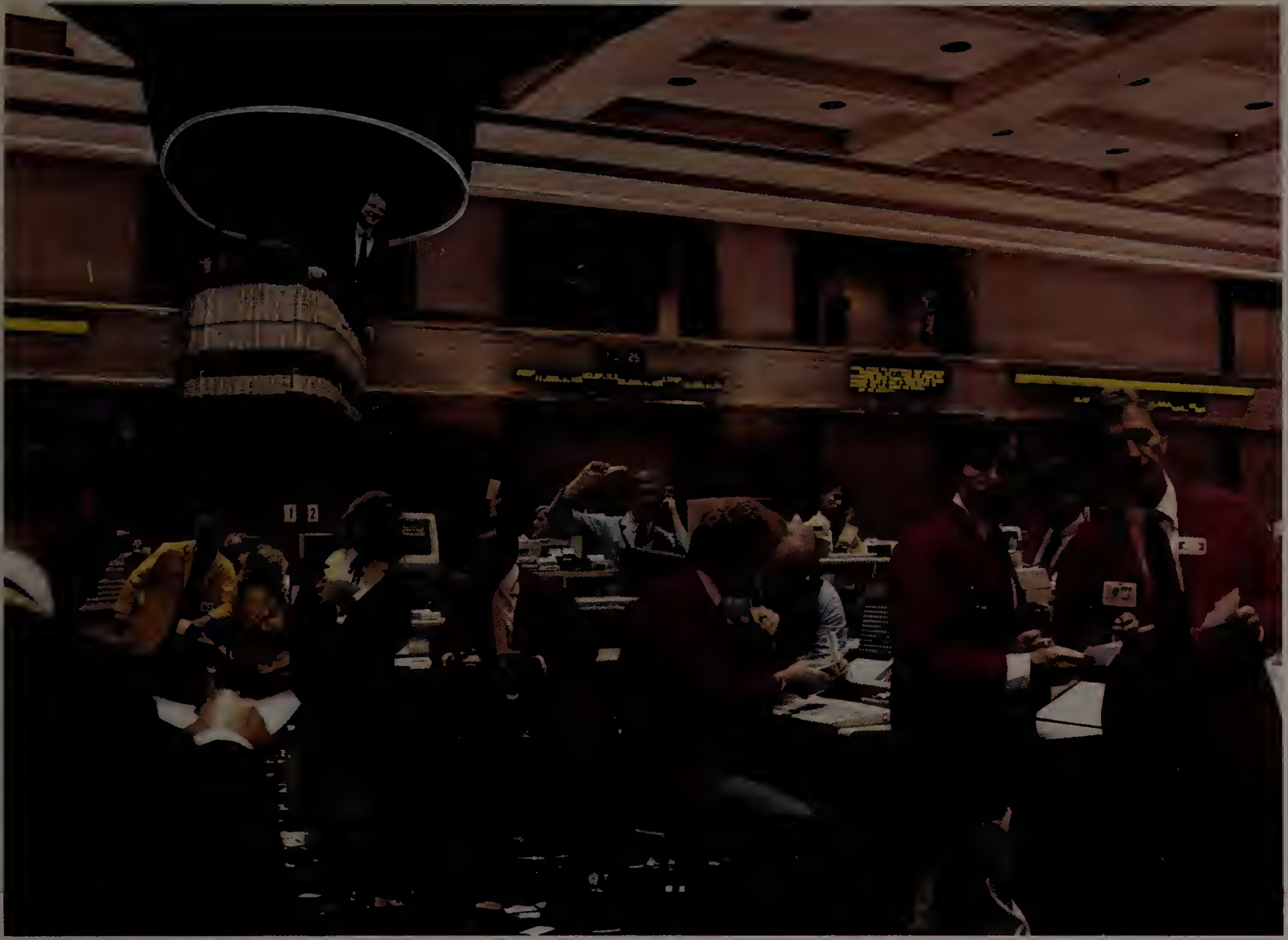
Since the first behemoth computers were shipped to businesses in the early 1950s, there has been pressure to distribute computer intelligence. The motive has generally been better local control of the computing resource or more efficiency in information processing.

But with so many companies operating network-based applications, there is another motive: saving time for professional and administrative staff. The more distributed information processing, the greater productivity of all employees.

That was certainly the case with Blue Cross/Blue Shield of Maryland. Because the business was getting more complex every day, in 1984 Blue Cross/Blue Shield began a four-year plan to implement a corporate-wide office automation network—and chose Wang for word processing, office automation and Digital Voice Exchange (DVX).

The benefit in time saved approaches 27% for professionals and 28% for administrative support staff. A 20-month cost recovery and a return on investment of 56% is also projected thanks to the Wang OFFICE System.

The real advantage is the competitive edge Blue Cross/Blue Shield of Maryland achieves. Thanks in part to Wang, the corporation protects more people against the cost of health care than any other medical insurance company in the state.



To you, it's the world's largest business and financial center.
To us, it's creating a more efficient working environment for 7,000 tenants.

The tenants of 1 Financial Place in Chicago enjoy one of the most efficient working environments yet designed, an environment created and maintained by Johnson Controls. The systems that heat and cool them, light their workspace, help them communicate, and keep them secure are all integrated into one computerized, energy-efficient operation. To make them more comfortable, and thus more efficient. And to make the building more cost efficient, too.

Designing and installing automated systems for buildings is our business. Maintaining and servicing building systems through our Alliance programs is our business, too.

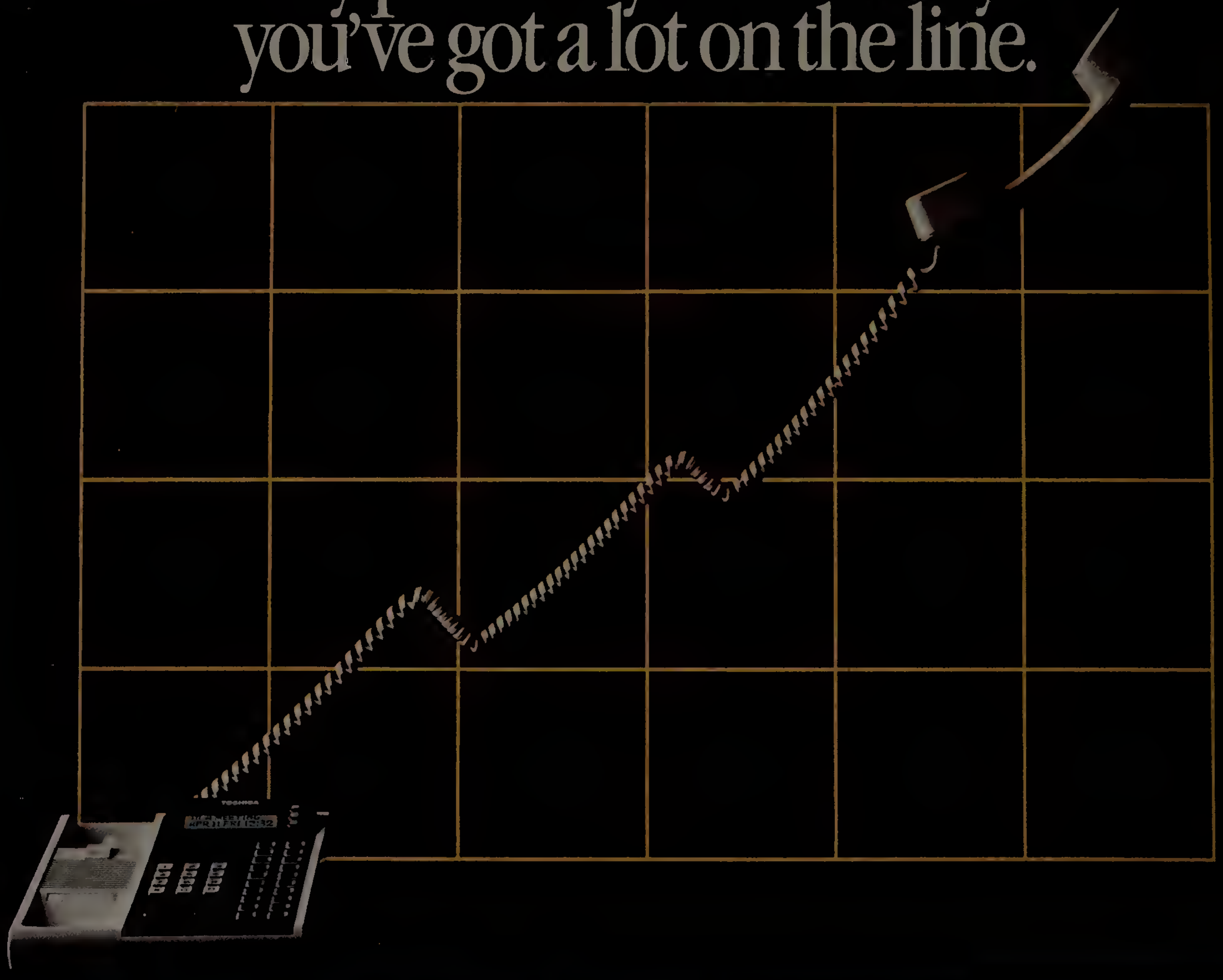
Over 100,000 building owners have chosen Johnson Controls for facilities management. These projects range in size from giants like 1 Financial Place to small offices in local communities.

For information on a working environment that can work to save you money, take advantage of our new Executive Contact Program. Give us a call now at 1-800-972-8040. In Wisconsin, call 1-800-472-6533. A Johnson Controls executive will get back to you within 48 hours.

JOHNSON CONTROLS
Creating a better climate for business.

©Johnson Controls, Inc. 1986 8602

# Toshiba.
# The only phone system to buy when you've got a lot on the line.



While others search for the secret to success, we've been delivering it. It's called consistent, reliable performance. And it comes in the form of a Toshiba Business Telephone System.

Choose any of our Strata$_e$® key systems. Or our Perception® digital PBX. With two to 120 lines. You'll get an advanced, no-worry system that'll stay with your business all the way to the top.

Our systems are so dependable, you'll enjoy virtually trouble-free operation. Day in, day out. Add easy, modular hardware expansion. Plus phones that work with all our systems. And your investment stays as solid as your telephones.

You'll also get the latest advanced features. Most of which are standard, not optional. Plus, they're easy to learn and use. So every employee can make the most of your system's capabilities.

You get it all from the $16 billion Toshiba Corporation. Along with the resources and long-term strengths of a world leader in high technology.

So call us at **1-800-222-5805**. Or write to us at 2441 Michelle Drive, Tustin, CA 92680, or at 111 Business Park Drive, Armonk, NY 10504. Ask us about our Strata$_e$ and Perception systems.

Because when your business is on the line, you need Toshiba on your phones.

TOSHIBA BUSINESS
TELEPHONE SYSTEMS.
THEY WORK.

©1986 Toshiba America, Inc. Perception and Strata are registered trademarks of Toshiba Corporation.

**TOSHIBA**
**TOSHIBA AMERICA, INC.**
**Telecommunication Systems Division**

# Users plan applications

continued from page 21

ply it to a need and be able to develop a plan that pulls various needs together."

In this way, Dykes and senior management can communicate effectively. "Senior management feels they are not constrained by a lack of technological knowledge, and we are not constrained because we know all their requirements," he said. "A company needs to have that kind of exchange."

In much the same way, James Albee, manager of corporate telecommunications for Oklahoma City-based Kerr-McGee Corp., develops strategic applications for his company.

"An application usually gets its start right here," Albee said. "We'll come up with an idea, go out to bid, get all the numbers and then present it to the various levels of management. Basically, it's up to the department to come up with applications and do research," he said. "We try to be more than just implementors of technology."

**Responding to directives**

In the 700-member law firm of Orrick, Herrington & Sutcliffe of San Francisco, Voice Communications Manager Mary Cady is responsible for the implementation of senior management's communications needs.

"I work very closely with the firm's new executive director," Cady said. "Most of the way my function is carried out involves ideas coming from the management to the executive director, who passes them along to me for implementation."

Prior to the executive director's joining the firm, there was no method for Cady to approach the executive committee with an application. "There were discussions about what was happening in telecommunications and what would apply to the firm, but it wasn't my place to go to the executive committee and sell an application," she said. "The executive director is very knowledgeable and aware of technology, and he now does that."

**Team effort key to success**

There is no better example of the team effort of creating strategic applications than that of First Wisconsin National Bank ("Banking on high-tech teamwork," *NW*, Dec. 22, 1986). Without disrupting service, this banking institution replaced its entire data communications system in 18 months, installing a private T-1 backbone network that serves more than 300 banking sites in a four-state region.

According to Robert Harrold, vice-president of the Milwaukee-based bank, it took "a combination of people getting their heads together, all the way from the top of the corporation down into the ranks of the information services division."

The 18-month planning process involved MIS people, marketing staff and customer service representatives, Harrold said. The result was a five-year plan for a T-1 and fiber network that matched a number of other five-year plans within the bank, such as the mainframe and disk storage capacity plans as well as the plans to install workstations in bank locations. "We couldn't have done it without a total team effort," Harrold said.

> Keeping upper level managers informed throughout implementation cycles makes them more aware of how communications technology applies to the company.

**Small pilot program a plus**

Honeywell's Dykes suggested starting small, with a pilot program, once an application is approved and a vendor is selected. "A pilot demonstrates that the group I'm in and the user we are installing the application for are able to work together, not only to define requirements but to solve problems," he said.

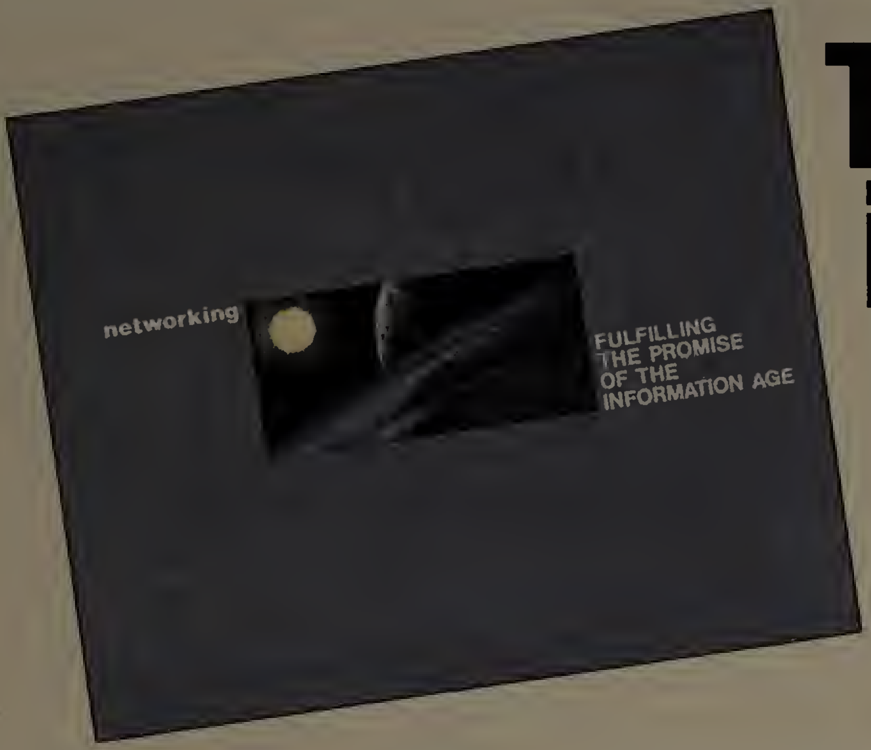
"It also demonstrates that we have an appreciation for the economics of the situation," Dykes said. A pilot program allows the group to "verify that something works before a full-blown implementation is attempted."

**Keeping management informed**

Keeping upper level managers informed throughout various programs' implementation cycles makes them more aware of how communications technology applies to the company's plans, for instance, how it applies to computer integrated manufacturing (CIM).

"Management recognizes that communications is a key to CIM," Dykes said, "so they're coming back to us now and saying, 'What are you doing, does your planning apply, or are you implementing a project soon enough to tie in with other projects?' It's become a shared responsibility, with everyone involved."

The Network is the future...



Computers have allowed mankind to gather, store and analyze more information than ever thought possible. Now, the "Information Age" is entering another phase: Networking.

Driven by incredible technological advances, networking is on the verge of creating widespread, democratic access to information. And information is power. As John Naisbitt points out in his bestseller *Megatrends*, "The new source of power is not money in the hands of the few, but information in the hands of many."

For businesses, networking has become more than a convenient way to link people and data. It is now a strategic tool, revolutionizing the way businesses compete.

The computer and communications have come together in networking. New ways of doing business, new markets, and major changes in the way our society functions are the results. It has already started, and it has just begun.

You can read all about it in this free new booklet from the publication that was started to cover the networking revolution, *Network World*.

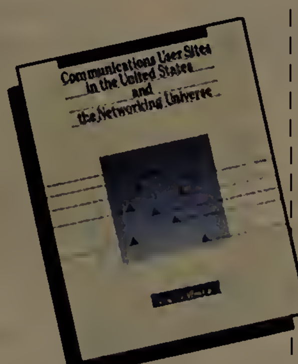
Using lively quotes, brief case studies, and key market facts, this booklet is both interesting and informative.

It shows why networking is such an important part of the information age, looks at the power it has to change the way we function, and shows, on a very practical level, how all this is already happening. It also shows what this will mean to those whose business is providing products and services to this new and exploding marketplace.

We invite you to send for a free copy of this booklet. And we'll also enclose a copy of our new market brochure "Communications User Sites in the United States and the Networking Universe." It will give you important details on the structure and size of the networking market and how *Network World* serves its key decision makers.

Just send in the coupon below or call Mary Fanning at 617-879-0700. Your *Network World* sales representative can also supply you with both items. If you're in the computer/communications marketplace, we think you'll find them among the most important things you read this year.

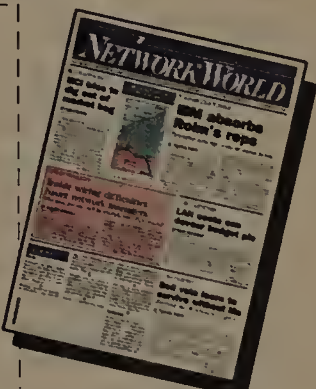
...the future is in Network World



Doug DeCarlo, Publisher
***Network World***
375 Cochituate Road, Box 9171, Framingham, MA 01701-9171

☐ Please send me copies of your booket, "Networking. Fulfilling the Promise of the Information Age," and your market brochure, "Communications User Sites in the United States and the Networking Universe."

Name________________
Title________________
Company________________
Address________________
City________State______Zip______
Phone________________



NETWORK WORLD
A CWCI Publication
An International Data Group Company

**BOSTON:** Donna Pomponi, (617) 879-0700 **NEW YORK/PHILADELPHIA:** Joan Daly, (201) 967-1350 **WASHINGTON, DC:** Bill Burke, (301) 721-4763 **SAN FRANCISCO:** Chris Clyne, (415) 328-4618 **ALTANTA:** Tom Tolbert, (404) 394-7509 **CHICAGO:** Fran Jonikaitis, (312) 827-4433 **LOS ANGELES:** Dave Pronenko, (714) 545-7278

# C-COR Has A Line That Monitors Your Success

As a data communications manager, you put your status on the line every day. With C-COR's Quick Alert status monitor system watching over your broadband line, you can handle your distribution system with complete confidence.

Quick Alert monitors and controls vital components, allowing you to smoothly manage your network. Thanks to advanced software, the system automatically alerts the operator of impending failures. This significantly reduces downtime and transforms costly emergency repairs into planned maintenance. To put it plainly, Quick Alert makes you look smart.

If a fault should occur, the system tells you the precise nature and location of the trouble and automatically switches into backup operation—again saving you valuable time. In addition to monitoring, Quick Alert also controls the function of key components, such as A-B Switches, Active FailSafe Amplifiers, and others. And Quick Alert is compatible with other vendors' equipment.

To find out more about why C-COR Electronics' broadband line has become the definitive choice of Local Area Networks worldwide, either return the coupon or call us toll-free at **1-800-233-2267 Ext. 3251.** And start putting 34 years of broadband experience to work for you.

Quick Alert, A-B Switch, and FailSafe are trademarks of C-COR Electronics, Inc.

**Drop me a line about C-COR's broadband LAN products.** I'd like to know more about how C-COR's broadband line can help answer my company's communications system needs.

Name

Company ( ) Office Phone

Address

City State Zip

NW 5/87

C-COR®
ELECTRONICS INC
Broadband Is Our Line
60 Decibel Road, State College, PA 16801

# NEW PRODUCTS AND SERVICES

See inside for:
▶Geneva's mini-PC software
▶Simpact's BSC boards
▶Dynatech's X.25 tester

▶ *ICA CONVENTION*

## ITT boosts digital PBX

**BY JIM BROWN**
New Products Editor

HARRISBURG, Pa. — ITT Business Communications Corp. is expected to unveil enhancements to its digital System 3100 private branch exchange, along with new feature telephones, at the International Communications Association convention in New Orleans next week.

The company is expected to unveil a new, higher density port card that will support eight lines, vs. the two- and four-line cards now available. Use of the new port cards will enable the present System 3100LX, which supports up to 384 ports, to be upgraded to the System 3100XL, capable of supporting 576 ports spread across up to eight stackable line-cabinet modules. The firm will also release new software that improves the earlier switch's functionality.

The company is also slated to unveil an enhanced attendant console by providing an RS-232 link for its IBM Personal Computer-based ITT Message Director package, an electronic messaging system.

With the upgraded software for the 3100XL, Version D5.2, ITT will double the number of calls that can be parked on the switch to 16. The new software will also increase the number of station hunt groups to 64. Each of these groups will support up to 128 stations.

The upgraded software will also double the buffer capacity of the switch's station message detail recording and improves the switch's remote programming and diagnostic capability.

In addition to supporting a universal numbering plan in campus environments, the PBX will also now support a four-number dialing plan that allows a call from one 3100 System to be directly transferred to another 3100 System over tie-line trunks. Previously, calls between systems were transferred by dialing an incoming trunk.

The new 11-button and 19-button feature phones will come in display- and basic-feature versions.

In addition to voice switching, the 3100 System will also support asynchronous data switching at speeds up to 19.2K bit/sec. To support both voice and data, the system uses three twisted-pair wires. One pair carries voice, one pair carries data and one pair transmits control signals.

The enhanced 3100 System is expected to be priced between $450 and $550 per line, depending on configuration. The new feature phones are expected to cost between $100 and $300.

ITT Business Communications' address is P.O. Box 4038, Harrisburg, Pa. 17111 (717) 564-4343.

▶ *ETHERNET LINKS*

## Vitalink enhances TransLAN bridge

*Firm adds T-1 interface, new software.*

**BY JOSH GONZE**
Staff Writer

FREMONT, Calif. — Vitalink Communications Corp. last week added a T-1 interface and software enhancements that increase the efficiency and control of its wide-area networking bridge, TransLAN, used to link remote Ethernet local networks.

The T-1 interface, used to support TransLAN's terrestrial 1.54M bit/sec digital transmission option, has been enhanced by incorporating the data service unit onto the interface board. A separate channel service unit is still required.

The first software enhancement enables the exchange of routing information between multivendor devices, thereby increasing routing efficiency. Another enhancement, the autodial back-up facility, creates extra capacity when needed.

According to Vitalink, TransLAN listens to every frame transmitted on each attached local net. This allows it to keep an activity log recording all traffic, errors, collisions and resource status. Its architecture allows in-band or out-of-band monitoring, meaning net management data can either share station traffic circuits or be sent over dial-up circuits.

The autodial back-up software allows the wide-area network, whether T-1- or satellite-based, to sense when primary circuits have become congested or broken down. In either case, TransLAN will automatically dial back-up circuits using customer-provided AT&T Accunet Switched 56 service or any V.32 9.6K bit/sec modem.

The routing capability added to TransLAN, dubbed the "spanning tree," permits Digital Equipment Corp.'s LAN Bridge 100s and TransLANs to exchange information such as circuit speeds and network status. That information is used to arbitrate and create the most efficient data path.

The spanning tree uses a bridging technique selected by the Institute of Electrical and Electronics Engineers as the basis for its still unreleased bridging standard for linking all 802 local networks. The routing is transparent to end users.

The software enhancements will be available in 90 days as a free upgrade to existing customers' systems that have a current software maintenance contract or are under warranty.

The T-1 interface is available for $4,000 as an add-on for existing TransLAN systems and is standard on new TransLANs, which sell for $12,750.

Vitalink is located at 6607 Kaiser Drive, Fremont, Calif. 94555 (415) 794-1100.

▶ *ATTACHMATE*

## Software runs on PS/2

*Multisession gateway also bows.*

**BY JIM BROWN**
New Products Editor

BELLEVUE, Wash. — Attachmate Corp. recently enhanced its terminal-emulation software to support IBM's Personal System/2, and it announced a gateway option for the link package that supports up to 32 host sessions.

The package, dubbed Extra, enables IBM Personal Computer and Personal System/2 microcomputers to emulate IBM 3278 and 3279 terminals. This gives users the ability to toggle among as many as four mainframe sessions and one local application. These five sessions can also be displayed in windows on a single screen.

In addition to terminal emulation, the Extra package allows Personal Computer-attached printers to perform print jobs normally requiring an IBM 3287 mainframe-attached printer.

Requiring 90K to 150K bytes of RAM, Extra features the optional ability to access mainframe-based graphics with the use of the firm's Extra Host Graphics software.

Micros equipped with Extra can be connected to mainframes over direct coaxial cable links or via a local-area network gateway and can support file transfers and screen-capture capabilities. An upgraded version, due for release this fall, will support remote connections. Until then, remote links can be supported over the firm's RemoteStation software.

The Extra package supports such IBM file transfer packages as Send/Receive, TSO/Conversation Monitor System editor transfer and DISOSS PS/370 Transfer. In addition, it supports IBM's Personal Services/PC, Professional Office System/PC and several IBM application program interfaces (API), including the PC 3270 Emulation Program API, 3270-Workstation API, the High Level Language API, the Entry Emulator High Level Language API and the Server/Requester Programmer Interface.

The APIs allow programmers to create interactive applications between the personal computer in emulation mode and the host.

Requiring 90K to 150K bytes of random-access memory, the Extra package features the optional ability to access mainframe-based graphics with the use of the firm's Extra Host Graphics software.

The Extra Entry-Level supports a single mainframe connection as well as IBM's Send/Receive file transfer package. It also supports IBM's Personal Services/PC and Professional Office System/PC software, and IBM's PC 3270 API, Entry Emulator High Level Language API and Server/Requester Programmer Interface. Extra Entry-Level also supports access to IBM's mainframe-based entry-level Graphics Data Display Manager

See **Software** page 26

▶ *ACS NETWORK SYSTEMS*

# Software turns S/36-, S/38-type files to EDI

**BY JIM BROWN**
New Products Editor

CONCORD, Calif. — ACS Network Systems recently released software that translates files created on IBM System/36 or System/38 minicomputers to the evolving Electronic Data Interchange (EDI) standard.

Designed to reduce paperwork, EDI is meant to enable companies to exchange such documents as purchase orders, bills of lading and invoices between disparate computer systems. The scheme calls for the sender to translate a document to a standardized format that is transmitted over third-party or private networks meeting EDI communications protocol standards.

EDI lets companies exchange purchase orders, bills of lading and invoices between disparate computer systems.

The receiver translates the EDI-formatted document to the internal format of the processor.

The new EDI/36 and EDI/38 packages enable IBM System/36 or System/38 minicomputer users to join EDI networks supporting the ANSI X.12 standard.

The packages consist of a Data Communications module, a System Services module and a Document Translation module.

The Data Communications module is used to configure the system for modem and line characteristics, and it monitors the transmission of messages and displays message-status reports.

The System Services module acts much like an electronic mail mailbox. It will collect and time stamp both incoming and outgoing messages. In addition, the module converts the EDI envelope surrounding each incoming EDI message to be compatible with the System/36 or System/38. It will also place an EDI envelope around each outgoing EDI message.

The Document Translation module does the actual translation of user-defined System/36- or System/38-formatted messages to the EDI format, and vice versa. It includes user-defined tables that convert information such as product codes and customer address codes to the internal codes used by the message receiver.

The package will support the EDI formatting used in several industries, including automotive, banking, electronics, government, medical, software development and telecommunications, the company said. It can also be customized to private EDI standards that do not conform to the ANSI X.12 standard.

The EDI/36 package costs $5,000, while the EDI/38 package costs $8,000.

A division of the New York-based ACS, Inc., ACS Network Systems is headquartered at 1485 Enea Court, Suite 1200, Concord, Calif. 94520 (415) 827-3820. ☐

THIS IS A PLUG FOR OUR 3500 SERIES.

Our 3500 Series TeleMux.®

The first time division multiplexer product able to talk with AT&T's subrate capabilities.

A logical extension of your T-1 network that is affordable, now.

How?

It can be used in conjunction with our Intelink® (or any other T-1 multiplexer) to access any telco.

Right now.

And, switch down to 2400 bits per second through DDS.

No other product can perform these functions at this price.

Which is nice.

We've got a simple one-sided tech sheet that you should call Greg Rose for: (401) 884-9075.

It's all you need.

Vs. their manual that takes an annual to read.

Dynatech

Dynatech Communications, Inc.
333 Main Street, East Greenwich, RI 02818

# Software runs on PS/2

continued from page 25

package.

The IBM Network Basic I/O System-compatible Extra 3270 Gateway Option will support connection to the mainframe for up to 32 local network-attached personal computers, each of which can support four sessions. The gateway option appears to the host as an IBM 3274 terminal controller and supports either Attachmate's micro-to-mainframe link or IBM's PC 3270 Emulation Program.

All of the new software is compatible with Attachmate's own emulator boards, as well as IBM's 3278/79 Emulation Adapter and 3270 Connection board for the Personal System/2. Upgraded software, planned for release in October, will support Digital Communications Associates, Inc.'s Irma and CXI, Inc.'s PCOX boards operating in Irma mode.

The firm also said it would begin offering its 3270 Coax Adapter, its Synchronous Data Link Control Adapter and its modem-equipped SDLC/Autolink Adapter unbundled from previous versions of its emulation software. The boards are compatible with IBM Personal Computers and the IBM Personal System/2 Model 30.

The Extra package costs $425, and the Extra Entry-Level package sells for $275. The Extra 3270 Gateway Option costs $50.

Attachmate Corp. is located at 3241 118th St. S.E., Bellevue, Wash. 98005 (800) 426-6283. ☐

# First Look

## Software links DEC minicomputers and PCs

**The Geneva Group** announced it will exclusively distribute **Hal Systems'** software that supports communications between two or more Digital Equipment Corp. PDP-11 minicomputers and IBM Personal Computers running communications software offering X-ON/X-OFF, echo, Hex or Xmodem error-correcting protocols.

Dubbed **PCX,** the program runs under DEC's RT-11 and TSX operating systems and transmits both ASCII and non-ASCII data. PCX features two operating modes. A console mode allows a DEC operator to transfer files to a remote DEC PDP-11 or personal computer, while the remote mode allows the central site DEC operator to allow remote PDP-11 or personal computer users the ability to access and transfer files from the central site PDP-11. A built-in security feature can force remote operators to supply logon and password entries.

PCX is priced at $400, which includes documentation.

It is being marketed by The Geneva Group under an exclusive agreement.

*The Geneva Group, P.O. Box 58998, Seattle, Wash. 98188 (206) 839-7358.*

## Board ties terminals to DEC devices 4,000 ft apart

**Distributed Logic Corp.** introduced a communications controller board that allows terminals and other peripherals to be located 4,000 ft away from a Q-bus-outfitted Digital Equipment Corp. computer.

**The CQ1622** controller employs RS-422 interfaces rather thân RS-232-C. Packaged on a single, dual-sized circuit board inserted onto the DEC Q-bus, the CQ1622 provides eight channels into a DEC MicroVAX, LSI-11 or MicroPDP-11 computer.

The CQ1622 runs standard DEC DH11 controller driver and diagnostic software under DEC's MicroVMS, RSTS/E, RSX and Ultrix-32m operating systems. It provides full-duplex communications for local terminals at software-selectable speeds of up to 38.4K bit/sec. The board can be configured to provide individual buffers on each channel or a single buffer for receiving data.

The CQ1622 costs $975.

*Distributed Logic Corp., 1555 S. Sinclair St., P.O. Box 6270, Anaheim, Calif. 92806 (714) 937-5700.*

## Software gives NBI PCs multiuser applications

**NBI, Inc.** released networking software that provides access to MS-DOS multiuser applications from both NBI and IBM Personal Computers.

Designated **Multinet/ONE** (Open Network Architecture), the networking package works with NBI's own personal computers and IBM Personal Computers connected over twisted-pair wire. The software also allows personal computer users to store and retrieve DOS files and programs to the hard disk drive of other Multinet/ONE workstations.

In addition to supporting file transfers between NBI's 5000 Series of electronic publishing workstations, the Multinet/ONE package also provides personal computer access to NBI's 500 Series of minicomputers as well as its Oasys Personal Workstations and cluster controllers.

The firm also released its **Softclone** software, an MS-DOS utility that allows Lotus Development Corp.'s 1-2-3 spreadsheet application to operate on NBI's Oasys 2000 personal computer.

Multinet/ONE, which will include Softclone, is priced at $1,595.

*NBI, Inc., 3450 Mitchell Lane, P.O. Box 9001, Boulder, Colo. 80301 (303) 444-5710.*

## Boards let DEC systems support BSC protocols

**Simpact Associates, Inc.** announced a family of communications boards that allow Digital Equipment Corp. systems to support IBM Binary Synchronous Communications protocols.

Each of the four products in the **CPI 10000 Series** family supports a different BSC protocol implementation and comes in versions for DEC's VAXBI-, Q-bus- and Unibus-equipped computers running under VMS, Ultrix or RSX operating systems. The **CPI 10000** board supports IBM's point-to-point 2780 and 3780 BSC protocols. The **CPI 10100** board supports IBM's multipoint 3270 interactive BSC protocol.

The **CPI 10200** board allows DEC systems to receive such financial market protocol data from sources such as the Securities Industry Automation Corp., the National Association of Securities Dealers' Automated Quotations and the Options Price Reporting Authority.

The **CPI 10300** board supports the Houston Automatic Spooling Program multileaving protocol used by IBM remote job entry workstations.

Each board contains protocol software embedded on a multiport front-end intelligent communications processor (ICP). Each board is also supplied with a distribution panel kit and user documentation.

The four-port VAXBI and Q-bus versions support full-duplex data rates up to 19.2K bit/sec. The eight-port Unibus version supports rates up to 9.2K bit/sec.

Each board can also be configured to support a single line operating at up to 56K bit/sec.

Prices range from $5,300 to $10,500.

*Simpact Associates, Inc., 9210 Sky Park Court, San Diego, Calif. 92123 (619) 565-1865.*

## Facsimile machines linked to encryption devices

**Ricoh Corp.** recently introduced an interface linking its Rapicom 200 Series facsimile machines to third-party encryption devices.

The **Private Facsimile Interface (PFI)** utilizes the internal modem in Rapicom 120, 200, 205, 210 and 230 digital facsimile machines along with an RS-232 link to connect to encryption devices. The PFI includes a switch that allows users to select whether facsimile machine output will be sent to the encryption device before accessing the telephone line or whether it will be sent directly to the telephone line.

The PFI costs $400.

*Ricoh Corp., 5 Dedrick Place, West Caldwell, N.J. 07006 (201) 882-2000.*

## PC-based application development tools

**Sage Software, Inc.** released two IBM Personal Computer software products designed to off-load computer-aided software engineering tasks from the mainframe.

The offerings are part of the firm's APS Development Center, a family of tools that automate application development and include several host-based modules. The **APS/PC Painters** package is an interactive tool for design, development and prototyping of application systems. It allows for such APS Development Center application development tasks as screen generation, reports and data structures to be done on the personal computer.

**APS PC/MVS Link** is the module used to link the personal computer to the mainframe-based APS Development Center modules. It is a VTAM application that also provides check-in and check-out functions during the data transfer.

APS/PC Painters requires an IBM Personal Computer XT, AT or compatible with a minimum of 640K bytes of random-access memory and DOS 2.0 or higher. Also required is a 10M-byte hard disk and IBM's EZ-VU II Runtime Facility.

APS/PC Painters is priced at $3,500 per copy, including dictionary, and the APS PC/MVS Link costs $15,000 per mainframe CPU. A volume discount is available.

*Sage Services, Inc., 3200 Monroe St., Rockville, Md. 20852 (800) 638-8703.*

## Device tests X.25 networks and components

**Dynatech Packet Technology, Inc.** introduced a measurement device for testing and evaluating X.25 packet-switching network components or an entire X.25 network.

The **Multi-Packet Load Simulator** sends X.25 data packets through a loading trunk to any X.25 packet-switching trunk. The unit tabulates the number of packets sent and received and calculates the delay associated with each packet. While generating a controlled flow of data packets to the X.25 network at speeds up to 72K bit/sec, the load simulator calculates the number of virtual circuits on the trunk and trunk performance and utilization. A video terminal attached to the device displays configuration information and performance statistics for up to 64 virtual circuits being tested.

Conforming to CCITT X.25, X.28, X.29 and X.121 recommendations, the unit supports V.35, V.11, V.24, RS-449 and RS-232 interfaces.

The device costs $13,860.

*Dynatech Packet Technology, Inc., 6464 General Green Way, Alexandria, Va. 22312 (703) 642-9391.*

We've got your number

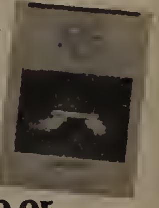
One of these four protocol analyzers is just right for you

Look us over.

53% of the data comm professionals in a national survey named Digilog as the ideal protocol analyzer.

Each model offers a solution as distinct as your needs. Yet, as a family, they are software compatible, operationally compatible, even data, disk, and remote control compatible . . . a good way to cut training costs when you need more than one analyzer.

Our four Digilog analyzers are ideal for field service, network test and diagnostics, software development, and network optimization and planning, Supports ALL protocols. 3-YEAR Warranty.



Digilog Inc.
1370 Welsh Road
Montgomeryville, PA 18936

Call toll free for demo or brochure. 800-233-3151.
In PA, call 215-628-4530.

DIGILOG
Leading in Data Communications Test and Control

ACCESS CHARGES

ALAN PEARCE

# FCC looks for trouble, gets it

Subscriber line charges (SLC), also known as access charges, have become one of the most controversial policy items ever dealt with by the Federal Communications Commission. The FCC, under recently departed Chairman Mark Fowler, never shied away from controversy. Indeed, it went looking for trouble when, in its final action under Fowler, it decided to increase SLCs from $2 per line per month for residential and single-line business users to $3.50 per line per month in three steps beginning on July 1, 1987.

The FCC also increased Centrex SLCs from $3 per line per month to $6 per line per month over the same period. Depending on local telephone company policies, this could make private branch exchanges more attractive to users.

Most politicians and state regulators are opposed to any increases in local telephone rates, especially since local telephone companies appear to be experiencing record profits. In an attempt to mollify Congress, the FCC said these will be the final increases in SLCs.

At the same time, the FCC revised its rules regarding mandatory pooling via the National Exchange Carrier Association (NECA).

All local telephone companies belong to the NECA pool, which is regulated by the FCC and state agencies. The pool was set up in order to average rates nationally for long-haul non-traffic-sensitive carrier common line charges. These nationally averaged rates go into the NECA pool, where the lower cost telephone companies subsidize the higher cost telephone companies.

For instance, in 1986, Bell Atlantic contributed more than $500 million to the NECA pool, Ameritech approximately $300 million and Nynex Corp. more than $120 million. US West received more than $300 million, and independents received about $650 million.

Under the new ruling, local exchange carriers who want to leave the NECA pool may do so after the final increase in SLCs on April 1, 1989. Companies that withdraw will be allowed to charge a carrier common line rate that is closer to actual costs. This means Bell Atlantic, Ameritech and Nynex will become more competitive and will be able to avoid massive local bypass.

Needless to say, rates in other areas will go up, perhaps making local bypass more attractive for major telecommunications users and AT&T.

Future local bypass will be more manageable due to:

- Continued rate reductions passed on by the local telephone companies to the interexchange carriers. This is the objective of the increases in SLCs.
- Lower levels of long-term support from the BOCs for the pooling arrangements set up following the divestiture of AT&T.
- The ability of the local exchange companies to introduce more flexible carrier common line rate structures.

AT&T will become much more competitive compared with MCI Communications Corp.'s Satellite Business Systems (MCI/SBS) and US Sprint Communications Co. because it will benefit from lower carrier common line rates. AT&T benefits almost exclusively from increases in SLCs.

MCI/SBS and US Sprint will sink into deeper trouble because their costs will increase, while AT&T's costs will decline.

Ratepayers will face increases in local exchange rates, which will be offset somewhat by lower long-distance rates. But not everyone uses the long-distance network, so it is the rich — big business users and those affluent enough to spend more than $50 a month on long-haul calls — that will benefit, while the poor will face further local rate increases.

This increase in local rates and its impact on the poor is causing political opposition on Capitol Hill and among state regulators. Congressional hearings have already been set for this spring. Bills stopping further increases in SLCs have been introduced in both the House and the Senate.

Congress is determined to assert more influence over telecommunications policy in the future. There are those on Capitol Hill who believe the April departure of Chairman Fowler will increase the power of Congress and that the new chairman, Dennis Patrick, will be more eager to placate Congress — especially since he needs congressional support to approve the nomination of a fifth member to the FCC.

*Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.*

MULTIUSER SYSTEMS

FRED MCCLIMANS

# LANs stand challenged

Personal computer local-area network vendors are entering a new creative phase with products such as 3Com Corp.'s 3Station and Nestar Systems, Inc.'s PC-286 Diskless Workstation. These products are necessary for local-area network vendors to compete for a new wave of advanced applications.

New memory- and graphics-intensive applications demand multiuser capabilities with shared data access and fast data exchange rates. This challenge is being met by multiuser microcomputers, such as AT&T's 3B1. Unless local net vendors counter with a solution, the personal computer local network — and its users — may be left in the cold.

Over the past decade, the microcomputer has evolved from a build-at-home kit to a powerhouse device that rivals mainframe units in power and speed.

Before users could blink, companies such as Microsoft Corp. and Micropro International Corp. had emerged to lead the personal computer software technology race. Along the way came Intel Corp.'s 8086 chip and then the 80286. Now it's the 80386. The result is today's powerful general-purpose personal computer.

Almost overnight, personal computer users started to automate as many office tasks as possible, including typing, manipulating accounting data and storing information. Soon, users realized that to use their data better they needed common access.

However, users were storing their data on their own personal computers. Local network vendors provided the solution for bringing all personal computers together by letting users in the same office or campus share data.

First, users automated with personal computers; then they connected their computers with local networks. Three years ago, that was enough.

The applications that were popular three years ago, however, are simple by today's standards and rarely exceed the personal computer's processing capabilities. Today's applications are more complex. VisiCorp.'s VisiCalc is great for spreadsheets, but it doesn't compare to a three-dimensional computer-aided design application running on an 80386 machine.

Personal computer software was developed to complement existing applications and fit into existing business niches. Spreadsheets were developed for accounting, word processing for text editing and data bases for MIS applications.

Firms built their computer inventories in a piecemeal fashion by filling each processing void when the necessary software and hardware became available. Today that's not the case.

Due to the incredible technological leaps that have been made, today's applications are more complex and often require enhanced graphics and memory support.

Additionally, protected-mode software is being shared simultaneously by a multitude of users, and many of these applications will not operate on yesterday's technology.

As a result, users are forced to purchase more advanced hardware

*McClimans is a staff consultant for Network Strategies, Inc., a communications consulting firm in Fairfax, Va.*

Tap your stream of consciousness. Send *Network World* a column for its opinions pages. Manuscripts must be letter-quality, double-spaced and approximately 600 to 750 words in length. Disk and modem submissions are preferred.

Columns should be timely, controversial, literate and technically accurate.

Contact Steve Moore, features editor, *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700, ext. 584.

**▶TELETOONS — By Phil Frank**

Its last words were "Your service contract has just expired."... then.. Ka-boom!
Phil Frank

to support their applications. Instead of growing into a personal computer and developing a need to link devices and exchange data, a large number of users are entering the market looking for complete systems.

Chances are, these users won't be interested in buying combinations of IBM or AT&T personal computers and trying to link them via a token ring or Ethernet. They'll want a system that fits together, and they only want to deal with one vendor.

This system could be a multiuser computer, such as the Altos Computer Systems Pick system or the Hewlett-Packard Co. Vectra. It could also be a local network with an enhanced workstation designed to operate over the network without any additional hardware or software.

Users are tired of having to deal with three or more vendors to find a system that meets their needs. This trend is almost a return to the old centralized mainframe approach, except that microcomputer-based systems offer increased power and flexibility at lower prices.

If existing local net vendors want to stay in business, they must develop complete systems. The local net personal computer must change from a device whose primary function is to pass data to a multiuser system designed to operate advanced applications in diverse environments.

Local-area network vendors need to be more in tune with providing software application environments, and they must continue to make advances in file server technology, data handling protocols, access methods, transport media and compatibility with other systems. These are features that multiuser devices are already starting to provide.

Ultimately, successful vendors must provide advanced local net systems that users can easily customize for vertical applications as well as for generic uses. Users should start thinking about potential future applications.

If local net vendors don't find ways to offer total solutions, current users may be forced to migrate to the new wave of multiuser systems. And for users who haven't already invested in a local-area network, these multiuser systems may be the answer. ◘

---

**CAREER STRATEGIES**

**JIM CARLINI**

# Orchestrate your advance

Communications managers, like many other technical managers, often aren't qualified to move into top positions. Why not? They often lack a wide understanding of today's technologies and a knowledge of good business practices. These managers feel like outcasts: Like tuba players in a punk rock band, they just haven't kept up with the times.

Corporate communications positions have evolved from a political, order-taking interface function in the predivestiture days, to a hands-on, entrepreneurial situation today.

Communications managers must be able to weigh the technical directions of competing vendors and apply good business judgment when selecting a product or service. And they must be aware of their firm's business objectives. Some managers are under pressure to learn the business side of their company or be replaced by MBAs. A few have not made the transition.

Getting ahead in communications and information technology management requires more than just technical skills. It requires a strong repertoire of leadership, business and technical skills that work in concert with a level of integrity that's acceptable in today's demanding business environment.

The ability to perform and understand a financial analysis of purchase vs. lease agreements is just one example of a skill that many managers lack. Knowing how to use personal computers to assist with managerial tasks is another area in which many managers fall behind. And interpersonal and leadership skills, which aren't taught even in the business schools, are also needed in top jobs.

Here are some specific skills regarded as most important by a sampling of senior corporate executives:

Ed Unterberg, managing director of Russell Reynolds Associates, Inc.'s high technology search practice, looks for "self-confidence combined with the ability to listen and determine a course of action." He looks for a team player who has the ability to bring his employees along.

Robert Olsen, vice-president of First National Bank of Chicago's Office Services, says it's critical that communications managers understand the importance of timely information transfer to the corporate bottom line. Losing a transaction translates to losing money, so tight management of information float — the time it takes to process a transaction — is vital.

When managing technology, managers sometimes must set a new tempo. David Larkin, vice-president of commercial buildings at Honeywell, Inc., states, "A person should demonstrate courage of conviction; the ability to stand up for something that they believe in, even if it's not the most popular view, or the one that everyone else supports."

Managers must be role models for their subordinates and have a multidimensional background to draw upon for making decisions. A manager who has had just one job experience at one company isn't as valuable as one who has held varied positions at several companies.

Companies march to different drummers when it comes to weighing prospective managers' experience against their potential. Some believe that both are equally important. As Unterberg observes, "Experience will get you in the door, but potential, coupled with the ability to develop and apply it, will keep you there."

Aspiring managers who lack extensive knowledge can take heart from Mike Heschel's comment that potential may be more important for promotions. Says Heschel, corporate vice-president for information resources at Baxter Travenol Laboratories, Inc., "I look for potential from internal people and experience from the outside. We know our people and can judge their potential."

Managers might want to put into practice a personal program to improve their business and technical skills and to set some objectives for their professional development. Otherwise, some may find themselves playing second fiddle to a young upstart — or worse, on the street and singing the blues. ◘

*Carlini is president of Carlini & Associates, a management consulting firm in Westmont, Ill. He also lectures on information technology at Northwestern University in Evanston, Ill.*

FEATURE FOCUS

# Meganets span corporate boundaries

## Cross-industry EDI works, but standards are still somewhere over the rainbow.

Continued from page 1

eliminate mountains of paperwork, but to reduce costs and gain a strategic advantage over competitors by communicating electronically with customers and suppliers.

Meganets fall into two general categories. The first includes user-owned and operated systems such as Rockwell International Corp.'s network, which links the company's Automotive Operations Division in Troy, Mich., to more than a dozen major car manufacturers that it supplies.

The second category comprises nets provided by third-party value-added communications vendors such as General Electric Information Services Co.'s EDI Express, McDonnell Douglas Electronic Interchange Co.'s EDI Net and IBM's Information Network.

Regardless of type, the advantages of these networks are the same, says Audrey Mandela, a senior analyst with The Yankee Group in Boston. They reduce users' paper-handling costs, eliminate costly errors and lower inventory requirements.

Indeed, the advantages to using such a network are so great, Mandela says, that it is not always necessary for communications managers to cost-justify their implementation to upper management. Instead, many managers report that corporate executives are satisfied that investment in such a network is sound if it acts only to improve customer relations.

Nevertheless, there are cost benefits to be realized. In fact, cost-cutting is the primary motivation behind one of the most ambitious internetworking projects now under way in the automotive industry, under the auspices of the Automotive Industry Action Group (AIAG), a coalition of automakers and suppliers formed in 1981.

### Standardizing

One way the AIAG is working to accomplish its goals is through the creation of standard business documents and a common standard communications protocol. This allows suppliers and manufacturers to exchange purchase orders, shipment notices, production invoices

☞ See **Meganets** page 32

*King is a freelance writer based in Woodhaven, N.Y.*

ILLUSTRATION©1987 WARREN GEBERT

IN
OUT
IN
OUT
Sobert

**Meganets** from **page 30**

and other transactions electronically. Industry experts say that by eliminating the massive pile of paperwork now generated by such transactions, automakers could shave some $200 from the cost of each U.S.-made car and truck.

In addition, standard electronic communications allows both suppliers and manufacturers to reduce their inventories significantly, because the receiving, processing and shipping of orders no longer is impeded by the time delays and high error rates associated with hard-copy purchase orders sent through the mail or orders executed over the telephone.

"From an operational standpoint, electronic communications makes daily shipping schedules possible," says Tom Zelinski, director of materials at Rockwell's automotive operations. "Another benefit has been in the planning process. For instance, because workers at the plant can see what they need from day to day, several weeks worth of inventory can be reduced to a few days worth or less."

Compared with many other automotive suppliers, Rockwell was ahead in recognizing the benefits of direct intercompany electronic communications, having set up its first system with Ford Motor Co. some 10 years ago. Under that system, telephone operators at Ford and Rockwell used punch cards to process orders and other transactions. Over the years, the system evolved to incorporate the use of dumb terminals, which still required operator involvement.

Today, Rockwell's transactions with more than a dozen of its major customers are processed electronically via its corporate mainframe, which automatically dials computers at customer sites to receive orders and to drop off shipping notices across the company's private network.

Because this system evolved gradually, no one has determined its exact cost savings, Zelinski says. However, he adds that the time the system has saved in processing purchase orders and executing deliveries has allowed both suppliers and manufacturers to reduce their inventories significantly, which in itself accounts for a substantial savings.

While Rockwell got a jump on some of its competitors by using its private network for intercompany communications, Zelinski concedes that direct computer linkups to customers have created something of a software nightmare for the company. For instance, because customers use a variety of electronic formats, Rockwell has had to accommodate more than 100 program modules to execute the orders of various customers.

Indeed, the costs and headaches associated with such incompatibility are the driving forces behind the automotive industry's efforts to standardize intercompany communications, says the AIAG's Associate Director Margaret Goscinski.

Specifically, the group is working with the ANSI X.12 committee for cross-industry electronic data interchange (EDI) standards to make sure the automotive industry's requirements are represented in a national standard, Goscinski says, emphasizing that the group's intention "was never to re-create the wheel," but to support a national standard.

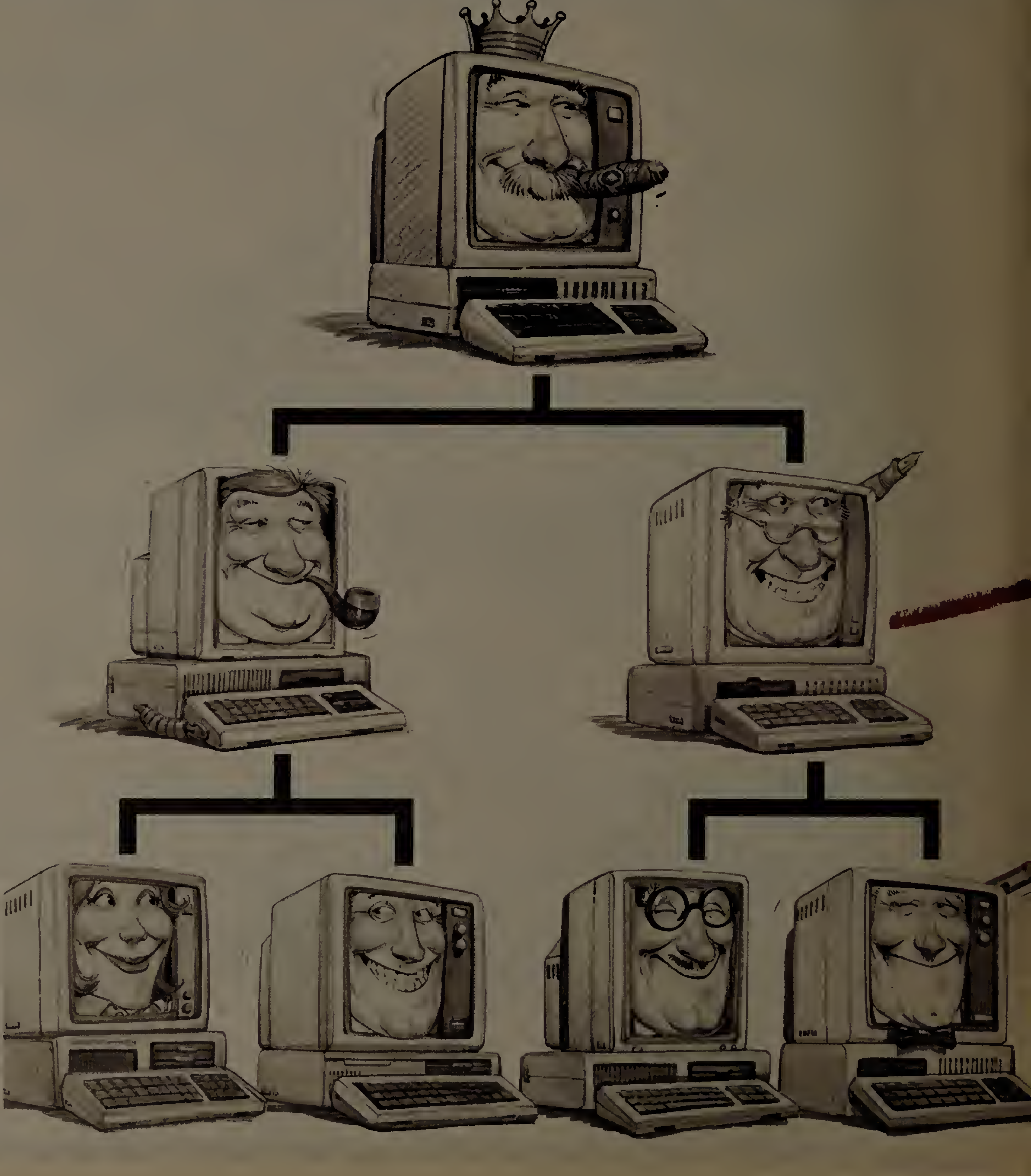
> "From an operational standpoint, electronic communications makes daily shipping schedules possible," says Tom Zelinski of Rockwell.

In October 1986, the AIAG finalized its version of an EDI standard, which defines the protocols for formatting and sending documents between companies' computers. The group has also worked with the ANSI X.12 committee to negotiate and reconcile a universal data dictionary and segment dictionary, which are used to construct the business documents and routing envelopes of intercompany communications.

Despite progress, however, industry experts maintain that adoption of necessary standards is still more than a year away. In the meantime, value-added network providers performing protocol conversion on documents transmitted between companies will continue to do a brisk business.

According to The Yankee Group's Mandela, these providers' revenues will most likely continue to grow 100% annually, as they have since 1984. Many industry analysts see the eventual conversion from direct point-to-point

Crosstalk Network
Because Networks



communications links to third-party network vendors as inevitable, because these vendors can provide volume data interchange much less expensively than private networks.

**Documents in the network**

Industries and users groups can put together their own industry-specific standards. The National Wholesale Drug Association (NWDA) has developed and implemented standardized forms now in use throughout the pharmaceutical trade.

The industry's use of standardized business documents dates back to 1982, when a change in Medicare policies altered the way certain drug distributors were charged for products.

Specifically, the change involved a wide pricing differential between those products sold to retail outlets and those sold to nonprofit centers such as hospitals.

The change created a "paperwork nightmare," says Bruce R. Siecker, director of operations and systems for the Alexandria, Va.-based NWDA. What was worse, he adds, it resulted in the industry's floating of more than $100 million on any given day.

One of the chief advantages of the Ordernet network is that customers can use it regardless of the computer equipment they may have in-house.

To remedy this situation, the NWDA adopted two standardized business documents for chargeback transactions and chargeback reconciliations. Siecker notes the documents have significantly decreased what was once a serious industrywide cash-flow problem.

The adoption of these standard documents, which are transmitted between distributors and manufacturers, has carved several days from the time required to process invoices. It has also worked to reduce error rates significantly, Siecker says.

Around the same time the two documents were adopted by the NWDA, Ordernet Services, Inc., a Columbus, Ohio-based value-added network provider, began specializing in the transmission of these documents between pharmaceutical distributors and wholesalers. Today, the company's network has more than 300 pharmaceutical wholesalers and distributors, and it handles 90% of all purchase orders and 85% of the total dollar volume of orders in the pharmaceutical industry. Ordernet has also expanded to include customers in the hardware and grocery industries.

One of the chief advantages of the Ordernet network over a private intercompany system is that customers can use it regardless of the computer equipment they may have in-house.

On its end, Ordernet handles all protocol and transmission-speed conversions, with the cost of these services split equally between the sender and receiver.

A second advantage is the customer's ability to communicate across industries, most of which have separate and distinct standard business document formats.

For example, a pharmaceutical wholesaler selling products to a grocery store chain can send information in its own industry-specific format, with Ordernet handling the conversion to the grocery store's standard format.

"We would love to see everybody in the same format, but that probably won't occur in our lifetime," Dodge says. "With the advent of more and more formats, interindustry communications will become increasingly important."

**Planning ahead**

The first step in this preparation process is the standardization of in-house documents, the Yankee Group's Mandela says.

Second, she says, users would be wise to check with industry associations to see what work has already taken place within their line of business. "With electronic data interchange, it doesn't make sense to strike out on your own," Mandela warns. "It is better to participate in a coordinated effort so that costs can be spread out," she adds.

Finally, Mandela urges managers not to be put off by costs associated with the transition because in just about all cases, the advantages to be gained far outweigh the initial capital investment.

These advantages, she says, include reduced error rates, better support and, perhaps most important, better service and support to customers in an increasingly competitive business environment. ◘

Communications. Are Only Human.

Now CROSSTALK's® benefits are available to every user on your IBM PC Network, IBM Token Ring Network, or other NETBIOS-compatible network.

That means significant hardware savings, by sharing a single modem and phone line among any number of network workstations.

But your network users share something just as important—the flexibility and ease-of-use that make CROSSTALK the most popular communications software for the PC.

Any network user can exchange files with a wide variety of other PCs, PC Networks, minicomputers and mainframes, including information utilities.

They can exchange files peer-to-peer within the network, at very high speed, without the need to go through the server.

And no one has to be a computer guru to do it. CROSSTALK adjusts to each operator's skill level. It's simple for beginners, who can do useful work immediately. Yet it's fast and powerful in the hands of an expert. It gives you the option of menu operation or direct commands.

It allows you to create "script files" containing commands and entries needed to complete an individual communications session. Any user on the network can create automated "scripts" for routine sessions, and other users can repeat the sessions with a minimum of keyboard commands.

In effect, every user on the network shares communications skills as well as equipment and software.

CROSSTALK Network Version gives you the communications potential that you expect from the standalone PC version. It emulates a wide range of popular terminals. It offers most protocols, including your own CROSSTALK protocol, XMODEM, YMODEM, and KERMIT.

For details on making use of the network savings potential of the CROSSTALK Network Version, see your dealer or ask us for a spec sheet.

CROSSTALK® XVI NETWORK VERSION

Digital Communications Associates, Inc.
1000 Holcomb Woods Parkway
Roswell, Georgia 30076
1-(800)-241-6393

CROSSTALK is a registered trademark of Digital Communications Associates, Inc.

▶ *EXECUTIVE SEARCH FIRMS*

# Stalking the wily headhunter

## *The right recruiter can put your career on the fast track.*

**BY JOAN ROULEAU**
Special to Network World

Considering a career move? Using a search firm doesn't have to be a gamble. The following suggestions should help you weed out the reputable search firms from the fly-by-night operations.

*Rouleau is director of communications for Goldfield Associates, a San Francisco-based search firm specializing in communications and advanced technologies.*

- **Ask for a list of positions the firm has filled in the previous year.** This will not only establish the credibility and stability of the firm, it will give you a sense of whether the types of placement the firm provides are interesting and appropriate for you.
- **Find out if the firm has an area of specialization.** Particularly if you are in a highly technical field, you will want to work with people who have a thorough understanding of the technologies with which you work. If you're a communications engineer, for instance, you should never have to explain to a headhunter the meaning of terms such as local-area network or X.25.
- **Be sure to get a signed statement that your resume will never be released without your permission.** In one notorious incident involving a now-defunct search firm, a resume was sent to another division of the candidate's present employer, seriously jeopardizing his career within that company.
- **Meet the recruiter with whom you'll be working,** or at least interview him extensively over the phone. Don't hesitate to ask about his credentials and his experience in your field.
- **Find out if the headhunter works on a contingency or retainer basis.** Contingency search firms are paid only when they place a candidate; retainer firms act as search consultants and are paid regardless of placement.

Contingency search firms usually do a higher volume business and place lower salaried positions. Retainer search firms, on the other hand, rely on long-term relationships with clients for whom they usually fill higher-level positions.

- **Ask for a detailed description of the company and position for which you are a prospective candidate.** If the headhunter hesitates in answering any of your questions about the company or a position, hold off sending your resume until you have investigated the reputation of the firm.

> Some firms merely farm out your resume.

- **At the outset, be sure you understand exactly what the search firm will and will not do for you.** Some search firms will merely farm out copies of your resume to any company that has any relation to your background. More reputable firms will guide you step-by-step through the selection process, advising you on matters such as a prospective employer's corporate culture or the characteristics most important to each interviewer.
- **Ask the headhunting firm how long it has worked with the client for which it's recruiting,** and how many placements it has made for the client. This should give you a sense of how established the relationship is between the headhunter and the client company.
- **Find out how you will be kept informed throughout the recruitment process.** A reputable search firm will update you regularly on the status of your application; a less professional firm is more likely to leave you in the dark.
- **Beware of any headhunter that asks you to limit your resume to one page.** This means that they are handling such a large volume of resumes that they don't have time to evaluate each of them carefully.

Such firms usually just look for certain buzzwords on a resume, without a real analysis of the candidate's strengths or interests. ◻

*Micro-to-mainframe access*

"Does anyone offer inexpensive ways to link PC's to the mainframe?"

ADACOM does.
If you need a fast but cost efficient way to create local or remote 3270 PC-to-mainframe links, ADACOM has what you need.

Whether you're linking one, or more than 200 PC workstations, we can help you do it faster at a lower cost.

**Eight IRMA-equipped PC's share one 3X74 coax port.**

ADAMUX/PC lets you grow in the most economical way possible—by connecting new users without adding coax ports.

Whether you want up to eight 3270 PC workstations to share a single coax port or 256 PC's to share 32, you can do it quickly and still retain all of the power of your local micro-to-mainframe connection.

**Remote one IRMA-PC Workstation without a FEP port and 3X74 controller.**

ADALINK/PC lets you add remote 3270 PC users in a fast and cost effective way—by using inexpensive dial up access direct to an IBM 3X74 coax port.

Geographically distributed users can have IRMA compatible micro-to-mainframe connections while sharing and accessing the same cluster controller.

**For cost effective micro-to-mainframe solutions call ADACOM today.**

For a full description of all the cost efficient ways ADACOM can help you with micro-to-mainframe connectivity, call or write.

We have what you need, today. And for tomorrow.

ADACOM
Connectivity solutions that really work.

8871 Bond St., Overland Park, KS 66214
913-888-4999 **1-800-3270ADA**

## Product Focus: Micro-to-host links

COMMUNICATIONS SOFTWARE

# Protocol converters feel peer pressure

BY JOHN HUNTER
Special to Network World

While vendors steadfastly proclaim protocol converters to be the best thing since zippers, users are often shocked at the amount of additional programming such products require just to support file transfers. Despite their shortcomings, however, protocol converters are still a user's best micro-to-host option — at least until peer-to-peer links come into their own.

Other, more expensive micro-to-host alternatives abound (see sidebar on page 38), but protocol converters are more popular because they let low-cost asynchronous terminals emulate high-priced IBM 327X Model 2 workstations. The early units were low-cost standalone replacements for IBM 327X cluster controllers; these units provided emulation services to enable asynchronous terminals and printers to function like 327X terminals and 328X printers.

Protocol converters used with personal computers provide the same services but usually consist of plug-in cards accompanied by disk-loaded software that performs part of the emulation and file transfer services. Some protocol converters use software to perform all functions.

The shift away from stand-alone units is evident from statistics compiled by industry analysis firm International Resource Development, Inc. (IRD) of Greenwich, Conn. According to IRD, 91.6% of all protocol converters shipped in 1985 were board-level products. "Our projections indicate that, by 1989, the board products will own 97% of the market, with the box share shrinking to 3%, " says Eric Arnum, editor of IRD's "E-Mail and Microsystems Newsletter." IRD's research shows the heavyweights in the board-level protocol converter markets to be Digital Communications Associates, Inc. (DCA) (45%), AST Research, Inc. (25%), CXI, Inc. (10%), IBM (7%) and Forte, a division of DCA (7%).

How long can protocol converter vendors stave off the LU 6.2 threat?

### No holiday for programmers

While protocol converters are less expensive to buy than IBM 3270 devices, additional outlays are necessary for system planning and operator training. "Many people think protocol converters are install-and-go products, and that's not the case, especially if 3270 emulation is being done and files are being transferred," says John Sundwall, vice-president, Western Region for DMW Group, Inc., a communications consulting firm. "Generally, the data processing staff gets involved to write software that converts host data into a form personal computer applications like Lotus can use, and that can be time-consuming and costly," he says.

Mike Denaray, manager of development and support for On-Line Business Systems, Inc. agrees. "Those conversion routine programs are generally handled by a programmer, and since those people are usually overworked, it might be a while before the job gets done. A personal computer can't use those [host-resident] files until things like packed decimal fields are converted and record layouts and the data to be extracted are defined."

Richard Amster, a personal computer consultant with First Interstate Services Co. in Portland, Ore., has experience with such conversions. He suggests that users employ a fourth-generation programming language or a report writer to handle the data extraction and formatting problem. But John McQuillan, president of McQuillan Consulting in Cambridge, Mass., opines that "users would be dumb to write those conversion routines when good off-the-shelf packages like Goldengate [from Cullinet Software, Inc.] and Tempus Link [Micro Tempus, Inc.] will do it for them."

### A user speaks

One user in McQuillan's camp is Wayne Graham, manager for end-user computing at Holly Farms in Wilkesboro, N.C. Graham chose Performance Software, Inc.'s MasterLink to run with his CXI PCOX boards and feels he got his money's worth. "We're letting MasterLink handle the extraction of data stored in the data base, telling

☞ See **Converters** page 38

*Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.*

## Micro-to-host links

| Vendor | Model | Packaging | Host interfaced | Microcomputer supported | Host communications software interface | Microcomputer memory required | Terminals and printers emulated | Functions not supported | File uploading and downloading | Editor bypass | Security | Windows supported | Transmission speed and protocols | Price(s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adacom Corp.<br>Overland Park, Kan. | CP-301 | Hardware and software | IBM 3X74 | Any IBM Personal Computer | NA | 128K bytes | 3278 | | Both | NA | Password | | 19.2K bit/sec; proprietary | $1,480 (per PC) |
| AST Research, Inc.<br>Irvine, Calif. | AST-SNA | Hardware and software | IBM System/36, 303X, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS | 192K bytes | 3278, 3279; 3287 | | Both | ✓ | | | 9.6K bit/sec; BSC, SDLC | $895 (per PC) |
| Avatar Technologies, Inc.<br>Hopkinton, Mass. | Mac Main Frame | Hardware and software | IBM 30XX, 43XX | Apple Computer, Inc. Macintosh | Interfaces with IBM 3X74 controller | Not Available | 3278 | | Both | | Password | | Depends on 3X74 | $1,195 (hardware and PC software), $500 (host site software) |
| CXI, Inc.<br>Mountain View, Calif. | PCOX/Plus Remote | Hardware and software | IBM 30XX, 43XX, 9370 | Any IBM Personal Computer | VM/CMS, MVS/TSO, CICS/VS, DOS/VSE | 340K bytes | 3278, 3279; 3287 | | Both | ✓ | | ✓ | 19.2K bit/sec; SDLC | $895 (per PC) |
| Cincom Systems, Inc.<br>Cincinnati, Ohio | PC Contact | Software | IBM 30XX, 43XX | Any IBM Personal Computer | VM/CMS, MVS/TSO | 128K bytes | 3278, 3279 | | Both | ✓ | Password | | 19.2K bit/sec; SDLC | $20,000 (DOS/VSE), $30,000 (MVS), $500 (software per PC) |
| Cleo Software Division of Phone 1, Inc.<br>Rockford, Ill. | 3780Plus | Hardware and software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS | 128K or 256K bytes | 3278 | APL keyset; structured field | Both | ✓ | | | 9.6K bit/sec; Cleo-3270 SNA or BSC, Cleo-5250 SNA | $995 (PC software), $2,195 (SNA gateway) |
| Communications Research Group<br>Baton Rouge, La. | Blast | Software | IBM, Digital Equipment Corp. Data General Corp., AT&T, Hewlett-Packard Co. | Any IBM Personal Computer, AT&T, Apple II & Macintosh | VM/CMS, MVS/TSO (IBM); VAX/VMS, PDP/RSX, RT-11, (DEC); AOS, AOS/VS (DG); 3000/MPE, 1000/RTE (HP) | 128K bytes (IBM); 512K bytes (Apple) | DEC VT100<br>DG D-200 | Scrolling | Both | | Password, audit trail | | 4.8K bit/sec asynchronous; 19.2K bit/sec direct connect | $250 (Apple), $395 (AT&T), $495 to $695 (DEC), $495 to $595 (DG), $1,590 (HP/3000)/ $250 (HP 110, 120), $5,500 (IBM mainframe)/$250 (for PC) |
| Communications Solutions, Inc.<br>San Jose, Calif. | Access-SNA | Software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS, IMS/VS | 192K bytes | 3278, 3279; 3287 | | Both | ✓ | | | 9.6K bit/sec; SDLC | $200 (per PC) |
| Computer Corp. of America<br>Cambridge, Mass. | PC-204 | Software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, CICS/VS | 384K bytes | 3278, 3279 | | Both | ✓ | | | 9.6K bit/sec; BSC | $10,000 (host end) |
| Computer Vectors, Inc.<br>Oakland, Calif. | RCOM 2 | Software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS, DOS/VSE | 256K bytes | 3277, 3278, 3279 | Graphics | Both | | Passwords, audit trail | | 19.2K bit/sec; asyynchronous | $4,000 (DOS/VSE and CMS), $5,000 (DOS/VSE and CICS/VS), $8,000 (MVS and CICS/VS, $70 (software per PC) |
| Cullinet Software, Inc.<br>Westwood, Mass. | Infogate | Software | IBM 303X, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS, IDMS/DC | 384K bytes | 3278, 3279 | | Both | | Password | | 19.2K bit/sec; BSC, SDLC | $75,000 (host end), $300 (software per PC) |
| Datagram Corp.<br>E. Greenwich, R.I. | Model 24XX | Hardware and software | Any Burroughs Corp. | Any personal computer | Any Burroughs | Not available | Any Burroughs | | Both | NA | | | 19.2K bit/sec; asynchronous | $16,000 (8 ports), $24,000 (24 ports) |
| Digital Communications Associates, Inc.<br>Alpharetta, Ga. | IRMA Comm | Hardware and software | IBM 303X, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS | 320K bytes | 3278, 3279 | | Both | ✓ | | | 9.6K bit/sec; SDLC | $895 (per PC) |
| Digital Equipment Corp.<br>Merrimack, N.H. | DECnet DOS | Software | DEC VAX, Micro VAX, IBM 30XX, 43XX | Any IBM Personal Computer | DECnet, VM/CMS, MVS/TSO, CICS/VS | 256K bytes | DEC VT100/200, IBM 3278 | | Both | | Password | ✓ | 9.6K bit/sec; SDLC, BSC | $500 (software per PC) |
| Diversified Data Resources, Inc.<br>San Rafael, Calif. | RCOM PC | Software | IBM 30XX, 43XX | Any IBM Personal Computer | VM/CMS, CICS/VS | 128K bytes | 3278 | | Both | ✓ | | Not available | 19.2K bit/sec; SDLC | $4,000 (VM/CMS), $8,000 (CICS/VS), $70 (software per PC) |
| Dynatech Packet Technology, Inc.<br>Alexandria, Va. | CPX-25 | Hardware and software | Any supporting X.25 | Any personal computer | Any supporting X.25 or PAD | Not available | Any asynchronous | | Both | NA | Passwords, audit trail | | 19.2K bit/sec; X.25, X.3, X.28, X.29 | $2,250 (4 ports), $2,950 (8 ports) |
| East Com, Inc.<br>Rochester, N.Y. | Syncra | Software | IBM System/370, 30XX, 43XX, System/3, DEC VAX, PDP-11 | Any IBM Personal Computer | VTAM | 256K bytes | 3278, 3279, VT100 | | Both | | Password, user profile | | Up to 56K bit/sec; direct attach | Not available |
| Hayes Microcomputer Products, Inc.<br>Norcross, Ga. | Smartcom II | Software | Any DEC | Any IBM Personal Computer, Apple Macintosh | VAX/VMS | 192K bytes (IBM); 128K bytes (Apple) | DEC VT52, 10X | Program function keys, clear screen | Both | | | | 9.6K bit/sec; asynchronous | $149 (software per PC), $899 (modem for Macintosh), $700 (modem for IBM) |
| ICOT Corp.<br>San Jose, Calif. | X.25 PC Adapter | Hardware and software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, VM, CICS/VS | 56K bytes | 3278, 3279 | Extended data stream | Both | ✓ | Logon, passwords | | 19.2K bit/sec; X.25 and SNA/HDLC | $995 (per PC), $25 (host software) |
| Integrated Network Systems, Inc.<br>Mobile, Ala. | SDLC-PC | Hardware and software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS, DOS/VSE | 55K bytes | 3278, 3279; 3287 | Extended data stream and graphics | Both | ✓ | | | 19.2K bit/sec; SDLC | $995 (hardware and software per PC), $25 (host software) |
| JDS Microprocessing Associates<br>El Toro, Calif. | Hydra II | Hardware and software | IBM System/360, 370, 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS | Varies with third-party vendor used; works with VM Relay, Master Link, and RCOM | 3278, 3279 | | Depends on third-party software | NA | | | Hydra II board interfaces with byte multiplexer channel; 19.2K bit/sec; asynchronous | $7,900 (8 ports) to $13,900 (32 ports) |
| [illegible] Corp.<br>[illegible] | Series II Twinax | Hardware and software | IBM System/3X | Any IBM Personal Computer, Apple Macintosh, Wang Laboratories, Inc. personal computer | NA | Not available | IBM 5291 | | Both | NA | | | 19.2K bit/sec; asynchronous | $1,195 (1 port), $3,595 (7 ports) |

# NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

# Qualification Form for Free Subscriptions.

Please answer **ALL QUESTIONS,** sign and date the card.

Free subscriptions will be accepted only from individuals in the U.S. and Canada with active professional or managerial responsibilities in communications. The publisher reserves the right to limit the number of free subscriptions accepted in any business category. To qualify, you must answer all the questions below completely, **sign and date this form.**

**If address has changed, attach mailing label with old address here.**

☐ Address Change ☐ New subscription

First Name | Middle Initial | Last Name

Your Title

Company Name

Div. Dept

Street Address

City | State | Zip Code

Is the above your home address? ☐ Yes ☐ No

**I wish to receive a subscription to *Network World*:** ☐ **Yes** ☐ **No**

Signature ______________________________

Title ______________________________ Date ______________

Business Phone ( __________ ) ______________________________

**PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.**

## 1

My primary areas of activity. (Circle ONE only)

I am involved in evaluating communications (data, voice and/or image) products and services:

1. for *use within my own* company/organization
2. for *resale* to other companies/organizations
3. Both
4. Other (explain) ______________________________

## 1a

For communications, my primary responsibility is: (Circle ONE only)

1. Data Communications
2. Voice Communications
3. Both
4. Other (explain) ______________________________

## 2

Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

*Data Communications*

21. Management
    VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff:
    Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services

*Telecommunications*

31. Management
    VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks. Engineering, Design, R&D, Application Development
32. Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

*Factory Communications*

41. Management
42. Supervisory/Staff

MIS/Data Processing

51. Management
    VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications

Others

75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other ______________________________

## 3

Job Function

Which one of the following best describes your functional involvement with communications (data, voice, and /or video) products? (Circle ONE only)

Corporate

1. Business Management, Planning and/or Development

Communications System/Network

2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other ______________________________

## 4

Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)

Consultants

11. DP/Communications Consulting Services
12. Consulting Services (except DP/ Communications)

End Users

13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other ______________________________

## 5

In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)

1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

## 6

Check ALL that apply in columns A and B.

A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

B. These products and services are presently in use at this location:

| | A | B | Product/Services |
|---|---|---|---|
| *Computers* | | | |
| 01. | ☐ | ☐ | Micros |
| 02. | ☐ | ☐ | Minis |
| 03. | ☐ | ☐ | Mainframes |
| 34. | ☐ | ☐ | Printers |
| *Data Communications* | | | |
| 04. | ☐ | ☐ | Communications Processors |
| 05. | ☐ | ☐ | Comm./Networks Software |
| 06. | ☐ | ☐ | Digital Switching Equipment |
| 07. | ☐ | ☐ | Facsimile |
| 08. | ☐ | ☐ | Modems |
| 09. | ☐ | ☐ | Multiplexers |
| 10. | ☐ | ☐ | Protocol Converters |
| 11. | ☐ | ☐ | Network Mgmt. & Control |
| 12. | ☐ | ☐ | Test Equipment |
| 13. | ☐ | ☐ | 3270 Controllers |
| 35. | ☐ | ☐ | Intelligent Terminals |
| *Telecommunications* | | | |
| 14. | ☐ | ☐ | PBXs |
| 15. | ☐ | ☐ | Key Systems |
| 16. | ☐ | ☐ | Central Office Equipment |
| 17. | ☐ | ☐ | Integrated Voice/Data Terminals |

| | A | B | Product/Services |
|---|---|---|---|
| *Transmission/Network Services Equipment* | | | |
| 18. | ☐ | ☐ | Microwave |
| 19. | ☐ | ☐ | Satellite Earth Stations |
| 20. | ☐ | ☐ | Local Area Networks |
| 21. | ☐ | ☐ | Wide Area Networks |
| 22. | ☐ | ☐ | Packet Switching Equipment |
| 23. | ☐ | ☐ | Fiber Optic Equipment |
| 36. | ☐ | ☐ | T1 |
| *Communications Services* | | | |
| 24. | ☐ | ☐ | Packet Switching Services |
| 25. | ☐ | ☐ | Cellular Mobile Radio Services |
| 26. | ☐ | ☐ | Electronic Mail |
| 27. | ☐ | ☐ | Enhanced Services |
| 28. | ☐ | ☐ | Centrex |
| 29. | ☐ | ☐ | Long Haul Services |
| 30. | ☐ | ☐ | BOC Services |
| 31. | ☐ | ☐ | Independent Telco Services |
| *Other* | | | |
| 32. | ☐ | ☐ | Factory Communications |
| 33. | ☐ | ☐ | Online Data Bases |

## 7

Estimated value of communications systems, equipment and services:

A. which you helped specify, recommend or approve in *last* 12 months? (Check only ONE in column A.)

B. which you plan to specify,recommend or approve in *next* 12 months? (Check only ONE in column B.)

| | A | B | |
|---|---|---|---|
| 1. | ☐ | ☐ | $10 million and over |
| 2. | ☐ | ☐ | $5 million - $9.9 million |
| 3. | ☐ | ☐ | $1 million - $4.9 million |
| 4. | ☐ | ☐ | $500,000 - $999,999 |
| 5. | ☐ | ☐ | $250,000 - $499,999 |
| 6. | ☐ | ☐ | $100,000 - $249,999 |
| 7. | ☐ | ☐ | $50,000 - $99,999 |
| 8. | ☐ | ☐ | Under $50,000 |
| 9. | ☐ | ☐ | Don't Know |

## 8

Estimated gross annual revenues for your entire company/institution: (Circle ONE only)

1. Over $1 billion
2. $500 million to $1 billion
3. $100 million to $499.9 million
4. $50 million to $99.9 million
5. $10 million to $49.9 million
6. $5 million to $9.9 million
7. under $5 million

## 9

Estimated number of total employees at this location: (Circle ONE only)

1. Over 5,000
2. 1,000 - 4,999
3. 500 - 999
4. 250 - 499
5. 100 - 249
6. 50 - 99
7. 20 - 49
8. 1 - 19

3A06-86

PLACE
POSTAGE
STAMP
HERE

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES
P.O. BOX 1021
SOUTHEASTERN, PA 19398-9979

▲
FOLD HERE AND MAIL TODAY

## STOP. Did you do the following:

1. Supply old and new address if address has changed
2. Answer all questions
3. Sign and date form

Enclosed is my:
- ☐ Address change.
- ☐ New subscription request.

*THANK YOU.*

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

PLEASE TAPE HERE
▲

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] Data, [illegible]<br>[illegible], [illegible]. | DataLynx/3174 | Hardware and software | IBM 30XX, 43XX | Any IBM Personal Computer, Zenith Data Systems 171 and 181 | VM/CMS, MVS/TSO, CICS/VS | 128K bytes | 3278, 3279; 3287 | APL | Both | ✓ | Password | | 1[illegible]K [illegible]/sec; SDLC, asynchronous | $3,000 (4 ports), $6,500 (16 ports), $195 (software per PC) |
| Management Science America, Inc.<br>Atlanta, Ga. | ExpertLink | Software | IBM 30XX, 43XX | Any IBM Personal Computer | CICS/VS, IDMS/DC, TPMON | 256K bytes | 3278 | | Both | ✓ | Password, audit trail | | 9.6K bit/sec; BSC, SDLC | $3,000 per PC |
| McCormack & Dodge Corp.<br>Natick, Mass. | Millennium PC | Software | IBM 30XX, 43XX, 8100 | Any IBM Personal Computer | CICS/VS, IDMS | 256K bytes | 3278 | | Both | ✓ | Password, logon, user profile | | 9.6K bit/sec; BSC, SDLC, asynchronous | $32,500 (host end), $1,100 (software per PC) |
| Micom Systems, Inc.<br>Simi Valley, Calif. | M74XX | Hardware and software | IBM 30XX, 43XX | Any IBM Personal Computer | VM/CMS, MVS/TSO, CICS/VS, DOS/VSE | 128K bytes | 3278 | | Both | | Password, logon, audit trail | | 19.2K bit/sec; BSC, SDLC, asynchronous | $2,950 (4 ports), $5,650 (16 ports), $175 (software per PC) |
| Micro Tempus, Inc.<br>Montreal | Tempus Link | Software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS | 128K bytes | 3278 | | Both | ✓ | Password, user profile | | 19.2K bit/sec; BSC, SDLC, X.25 | $9,800 (host site for 10 users); includes PC software |
| Multi-Soft, Inc.<br>Edison, N.J. | Super-Link | Software | IBM 30XX, 43XX; DEC VAX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS | 384K bytes | 3278, 3270; TTY | | Both | ✓ | | ✓ | 10.2K bit/sec; SDLC or BSC | $48,000 (host software for 100 PCs) |
| On-Line Business Systems,<br>San Francisco, Calif. | Excelink | Software | IBM 30XX, 43XX | Any IBM Personal Computer | VM/CMS, MVS/TSO | 72K bytes | IBM 3101 | | Both | | | | 9.6K bit/sec; asynchronous | $12,500 (host site for 25 users), $150 (software per PC) |
| On-Line Software International, Inc.<br>Fort Lee, N.J. | Omnilink | Software | IBM 30XX, 43XX | Any IBM Personal Computer | CICS/VS | 256K bytes | 3278 | | Both | ✓ | Password, audit trail | | 4.8K bit/sec; SDLC, asynchronous | $30,000 (MVS), $20,000 (DOS), $495 (software per PC) |
| Orion Group, Inc.<br>Berkeley, Calif. | SNA LU 6.2 | Software | IBM 30XX, 43XX, System/36 and 38 | Any IBM Personal Computer | CICS/VS | 640K bytes | Any LU 6.2/PU 2.1 | | Both | NA | NA | | 56K bit/sec; SDLC | Not available |
| Pathway Design, Inc.<br>Wellesley, Mass. | NetPath 3270 | Hardware and software | IBM 30XX, 43XX 8100, Series I | Any IBM Personal Computer | VM/CMS, MVS/TSO, CICS/VS, VTAM, BTAM | 256K bytes | 3277, 3278, 3279; 3284, 3286 | 3279 graphics, extended data stream | Both | ✓ | | | 19.2K bit/sec; SDLC | $2,595 (4 ports) to $4,595 (32 ports) |
| Performance Software, Inc.<br>Richmond, Va. | MasterLink | Software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS, DOS/VSE | 256K bytes | None. Needs third-party board such as Irma | NA | Both | ✓ | Password, user profile | ✓ | 19.2K bit/sec; asynchronous, synchronous, SDLC | $2,500 (single-user DOS); $3,500 (single-user MVS) |
| Perle Systems, Inc.<br>Lombard, Ill. | PDS-350/294 | Hardware and software | IBM System/3X | Any IBM Personal Computer | IMS/VS, CICS/VS | 128K bytes | 525X | | Both | | | | 19.2K bit/sec; SDLC | $4,650 (4 ports), 15,350 (20 ports); $225 (software per PC) |
| Persoft, Inc.<br>Madison, Wis. | SmartTerm-240 | Software | DEC VAX | Any IBM Personal Computer | VAX/VMS | 512K bytes | DEC VT52, 100, 200 | Smooth scroll, screen backup | Both | NA | | | | $295 (per PC) |
| Protocol Computers, Inc.<br>Calabasas, Calif. | Model 276 | Hardware and software | IBM System/370, 303X, 43XX | Any IBM Personal Computer | VM/CMS, MVS/TSO, CICS/VS | 128K bytes | 3278-2; 3287 | ALT cursor | Both | | | | 19.2K bit/sec; SDLC | $3,550 (4 ports) to $9,700 (32 ports); $195 (software per PC) |
| Renex Corp.<br>Woodbridge, Va. | TMS-1 | Hardware and software | IBM System/370, 30XX, 43XX | Any IBM Personal Computer | VM/CMS, TSO | 512K bytes | 3278, 3279, 3862 | | Both | | Password, dial back | ✓ | 19.2K bit/sec; BSC, SDLC | $13,745 for 32 asynchronous and 2 synchronous ports; $150 (software per PC) |
| Simware, Inc.<br>Nepean, Ontario | Sim-PC | Software | IBM 30XX, 43XX, System/370 | Any IBM Personal Computer | MVS/TSO, VM/CMS, CICS/VS, VTAM | 192K or 384K bytes | 3278, DEC VT100; 3287 | | Both | ✓ | Password | | 19.2K bit/sec; SDLC, BSC, asynchronous | $15,000 site license (supports 12 sessions), $250 (software per PC) |
| Sterling Software, Inc.<br>Canoga Park, Calif. | Micro/Answer | Software | IBM 30XX, 43XX | Any IBM Personal Computer | CICS/VS, MVS/TSO | 256K bytes | 3278 | | Download | NA | Password, user profile | | 9.6K bit/sec; SDLC | $30,000 (DOS host), $40,000 (MVS host), $550 (software per PC) |
| The Systems Center<br>Dallas, Texas | NDM-PC | Software | IBM 30XX, 43XX | Any IBM Personal Computer | DOS/VSE VTAM | 300K bytes | None. Needs third-party board such as Irma | | Both | NA | | | 9.6K bit/sec; SDLC | $22,000 (host end), $400 (software per PC) |
| Tangram Systems Corp.<br>Cary, N.C. | Arbiter | Software | IBM 30XX, 43XX | Any IBM Personal Computer | VTAM | 32K bytes | 3278 | | Both | ✓ | Password, audit trail | | 56K bit/sec; SDLC, BSC | $25,000 (host site), includes PC software |
| Techland Systems, Inc.<br>New York | Bluelink 3270 | Hardware and software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS | 23K bytes | 3278 | | Both | | | | 4.8K bit/sec; SDLC | $795 (per PC) |
| Thomas Engineering Co.<br>Concord, Calif. | Uni-Tec | Hardware and software | Honeywell, Inc. (all), IBM System/370, 30XX, 43XX, Unisys Corp. 1100 | Any personal computer | DSA (Honeywell), CMS/TSO (IBM), CMS 1100 (Unisys) | 256K bytes | All Honeywell, IBM 3278, Unisys UNISCOPE | | Both on Honeywell; none with others | NA | Password | | 19.2K bit/sec; BSC, SDLC (IBM); HDLC (Honeywell); CMS 1100 and Telcon (Unisys) | $4,000 (4 ports) to $15,500 (28 ports); (includes PC software) |
| Universal Data Systems, Inc.<br>Huntsville, Ala. | Sync-Up SNA/3270 | Hardware and software | IBM 30XX, 43XX | Any IBM Personal Computer | VM/CMS, MVS/TSO, CICS/VS | 256K bytes | 3278, 3279; 3287, 3289 | | Both | | Password | | 9.6K bit/sec; SDLC | $2,075 includes modem and PC software |
| VM Personal Computing, Inc.<br>Danbury, Conn. | Relay Gold | Software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS | 192K bytes | 3278 | | Both | ✓ | | ✓ | 19.2K bit/sec; proprietary | $10,000 (host site); $250 (software per PC) |
| Winterhalter, Inc.<br>Ann Arbor, Mich. | DataTalker 3270 | Hardware and software | IBM 30XX, 43XX | Any IBM Personal Computer | MVS/TSO, VM/CMS | 128K bytes | 3278, 3279 | | Both | ✓<br>(TSO only) | | | 19.2K bit/sec; BSC | $1,295 (1 PC) to $2,395 (8 PCs) |

SOURCE: TMS CORP., DEVON, PA.

ALT = Alternate
APL = A Programming Language
BSC = Binary Synchronous Communications
CMS = Conversational Monitor System
DC = Data communications

HDLC = High Level Data Link Control
NA = Not applicable
PAD = Packet assembler/disassembler
SDLC = Synchronous Data Link Control
SNA = Systems Network Architecture

TPMON = TP monitor
TSO = Time-sharing option
VSE = Virtual Storage Extended

Note: *Network World* contacted IBM for information about its 3708, 3710 and 7171 protocol converters. However, IBM had not provided the information at press time.

**Converters** from **page 35**

CICS what portions of the records to pull. MasterLink also handles the data conversion. We recently had to change the MasterLink directory to add new applications, and it took only a few hours. Systems programming said it would take a month to do the same job," Graham says.

Products such as MasterLink are usually table-driven and use a combination dictionary/directory to identify and define record layouts and the form the data must be in to use the application. They also change EBCDIC to ASCII and convert host files to a form personal computers can use. Companies offering similar packages include On-Line Software International (Omnilink), Cullinet (Goldengate), CXI (Connectware), Micro Tempus (Tempus Link), On-Line Business Systems (VDAM), Sterling Software (Micro/Answer) and Tangram Systems Corp. (Arbiter).

IBM's Enhanced Connectivity Facilities, announced in June 1986, offer two micro-to-host facilities: Virtual Disk and Virtual File.

IBM's Enhanced Connectivity Facilities (ECF), announced in June 1986, offer two micro-to-host facilities: Virtual Disk and Virtual File. Virtual File takes care of file translations and transformations; Virtual Disk lets users access the host disk drives as if the drives were on the users' personal computers. Virtual disk facility competes with products such as Tempus Link, Arbiter and VDAM. ECF supports IBM Model 3708/3710 protocol converters and runs with MVS/XA, Time-Sharing Option (TSO) and Conversational Monitor System (CMS) software, but not CICS or MS-DOS.

A hot area in micro-to-host communications is VTAM subsystems, which provide MS-DOS users with sophisticated file transfer facilities for systems not supporting TSO or CMS. Products such as MasterLink, Arbiter and VDAM support VTAM subsystems and furnish services to access VTAM files, extract data and format it for use with personal computer applications.

**Training oversights**

While file transfers are important for protocol converters, network managers should not overlook potential land mines such as user training, especially if IBM 3270 emulation is involved. According to DMW Group's Sundwall, operators with no 3270 experience need training to recognize and react to system messages and to make sure they will not insert commands that confuse the host.

Another type of training is required when seasoned 3270 users receive a personal computer to replace a 327X workstation. "Those people run into productivity problems — at least initially — since the PC keyboard layout is not the same as the one they're accustomed to," says McQuillan. "All protocol converters remap the keyboard, and users must learn new keying to do familiar functions. They'll make errors until they adjust," he says.

Most protocol converters let customers change the keyboard map to suit their applications, but some make the job easier than others. Jerry Henderson, director of data processing for the Wayne Intermediate School District Regional Data Center in Wayne, Mich., looked at a number of protocol converters and found that the keyboard remapping facility of the Integrated Network Systems, Inc. (INS) Synchronous Data Link Control PC adapter was the easiest to use. Henderson says the district has more than 300 INS boards installed, and many are used for 3270 applications, so remapping was the easiest way to ensure productivity. "Our people had no problems adjusting," he says.

**Peer-to-peer pressure**

For those who would rather operate in native mode, IBM's LU 6.2 protocol permits peer-to-peer communications. LU 6.2 is part of IBM's Advanced Program-to-Program Communications, which allows application programs to communicate with each other as peer Physical Unit 2.1 devices. Personal computers use APPC/PC and its Conversation Verbs within applications to send and receive data between custom LU 6.2 applications and host-based applications such as DISOSS. The latter uses IBM's Document Interchange Architecture and Systems Network Architecture Distribution Service.

PU 2.1 supports multiple links and can multiplex multiple concurrent sessions per logical unit. PU 2.1 supports peer-to-peer communications using APPC and SDLC between a wide range of IBM systems, including System/36 and /38, Series 1, 5520, Personal Computer XT and AT, 9370 with VM/APPC, Displaywriter and Scanmaster. LU 6.2 is implemented on System/370, 30XX, 43XX and 8100 using PU 5.0 communications.

Spectrum Concepts, Inc.'s new XCOM 6.2 implements the IBM SNA extension to let users transfer files between the System/370, System/38, personal computers and Digital Equipment Corp. VAX/VMS machines. (Spectrum did not respond to requests for information and, therefore, does not appear in the chart.)

Given the flexibility and availability of LU 6.2, are protocol converters still a good buy? For now, it appears so, but users should begin planning for LU 6.2. According to Paul Rampel, president of the Berkeley, Calif.-based Orion Group, Inc., by 1990, one-third of all applications will use LU 6.2's peer-to-peer facilities, and two-thirds of all applications written thereafter will use LU 6.2.

What's the future for protocol converters? Rampel thinks they will be modified to provide some form of LU 6.2 support.

---

*MICRO-TO-HOST*

# Alternative connections

Before taking their pick of stand-alone and board-level protocol converters, users may want to check into several micro-to-host alternatives. These include local-area network gateways, minicomputers, communications processors, private branch exchanges, packet assembler/disassemblers and IBM 327X devices and 3270 clones. However, the protocol-conversion services these devices offer are part of an overall system, making them much more expensive than converters.

Most local network vendors have communications gateways that use an IBM Personal Computer AT to provide all cluster controller emulation, protocol conversion and communications services. Some stand-alone gateway vendors, however, claim an IBM Personal Computer AT will bog down with more than eight active nodes.

But Jerry Henderson, director of data processing for the Wayne County Intermediate School District in Wayne, Mich., said he feels otherwise. "We're currently testing an [Integrated Network Systems, Inc.] LAN gateway card in our ATs and see no degradation with 15 active users," he says. But his organization does interactive processing; performance may change once it implements large-scale file transfers.

Some communications processors are being equipped with protocol converters, which are also expensive.

The NCR Comten, Inc. Integrated Protocol Converter is roughly $6,000 for eight terminal ports and $15,000 for 32 ports.

PADs are also popular for linking personal computers to hosts and converting asynchronous data to X.25 standards. Many PADs are multiport units and transmit multiplexed data using synchronous, Binary Synchronous Communications, Synchronous Data Link Control and 2780/3780 protocols. PAD prices can exceed $8,000.

IBM's 3270 line and the many 3270 clones are the most widely used products for linking terminals to hosts. All support personal computers and provide full terminal emulation services, multiple simultaneous sessions and windowing. The 3270s usually sell as systems, and an IBM 3X74 cluster controller runs between $6,000 and $13,000. Clones cost as much as 30% less.

— *John Hunter*

---

**Correction:** In the chart accompanying a product focus on microwave systems ("Through hail, sleet or snow . . .," *NW*, April 20), some information supplied by vendors was incorrect. The correct information follows.

For the Avantek, Inc. DR23A — transmission capacity: 1.544M bit/sec or 6.312M bit/sec; number of voice channels: 24 or 96 (standard), 30 to 120 (optional); occupied bandwidth: 3.7 MHz or 15.4 MHz; bits per Hertz: 0.4; system gain: 94 dB at 10-6 BER; receiver sensitivity: -77 or -83 dBm at 10-6 BER; price range: $11,000 to $26,000.

The correct transmission frequency range for Digital Microwave Corp.'s DMC-23 system is 21.2 to 23.6 GHz; the correct occupied bandwidth is 10 MHz.

Also, *Network World* incorrectly reported two items regarding the Loral Terracom, Inc. TCM620. The correct number of voice channels supported is 672, and its occupied bandwidth ranges from 3 MHz to 40 MHz.

---

# Letter:

Regarding the article, "What does DEC have now" (*NW*, April 6) by David Palmer and myself, I would like to clarify two points. First, the discussion of VAXclusters on page 36 is inaccurate. VAX/VMS Version 4.6 is not currently available.

The current version (4.5) supports 16 Computer Interconnect (CI)-based VAXcluster nodes and 13 Ethernet cluster-based nodes.

The restriction on the number of cluster nodes supported will be lifted in a future VMS release.

Also, please note that the choice of the number of jobs in the example was arbitrary. The actual number of jobs that could be run depends on the size of the VAX processors involved.

On page 37, the speed of the CI bus is improperly stated at 10M bit/sec. The CI runs at 70M bit/sec; the Ethernet is a 10M bit/sec bus.

Ray Kaplan
Consultant
Pivotal, Inc.
Tucson, Ariz.

# AT&T, Equatorial VSAT woes

continued from page 1

*Network World* learned that AT&T has overhauled its Skynet Star Network Service, which now uses simpler, less expensive network equipment. The six-month overhaul effort caused the carrier to fall short of its 1986 customer projections.

Equatorial, considered by many to be the pioneer of VSAT networking, last week reported a $3.31 million loss for the first quarter of 1987, compared with a $74,000 loss for the similar period last year.

These and other recent developments are evidence of the malaise afflicting the VSAT industry, which vendors attribute to long sales cycles and the resource-intensive nature of pilot projects, among other things. Lack of VSAT user success stories has made prospective users wary of the technology.

Daisy Ottman, AT&T's Skynet Star Network Service marketing manager, said the company began restructuring the service shortly after it became available last year. Revamping Skynet included the replacement of the packet-switching gear underlying the satellite data transmission service.

AT&T claimed that the packet equipment initially used was too expensive and sophisticated for its early users. AT&T replaced this gear with less expensive, simpler packet switches, all provided by Harris Corp. This project, completed in January, also required AT&T to replace software at its net hub stations and at each VSAT station.

"We were originally offering a packet technology that did not adapt well to a satellite environment and was far more sophisticated and had many more features than the market really wanted or needed," Ottman explained. AT&T's VSAT bids were, consequently, often higher than those of its competitors. Despite the cost, AT&T was still able to secure Skynet contracts with the American Farm Bureau, May Department Stores Co. and Montgomery Ward & Co., Inc.

AT&T learned a costly lesson from early pilot tests with these customers. "A VSAT pilot is incredibly resource greedy," Ottman said. "It takes a tremendous amount of resources on the vendor and customer's side. We've learned that doing a VSAT pilot test is more than sticking a dish on a customer's roof," she said.

AT&T is big enough to be able to reassess its VSAT venture, a luxury smaller companies may not be able to afford.

Equatorial's revenue plummeted 37% from $18.8 million for the first quarter of 1986 to $11.9 million for the first three months of 1987. The company's equipment revenue dropped from $11.6 million in 1986 to $5.99 million for the first quarter this year. Network service revenue was down from $5.24 million last year to $3.71 million this year. Field service revenue, however, rose from $1.94 million for the first three months of 1986 to $2.20 million this year.

Edwin Parker, Equatorial's president and chief executive officer, said the company's losses were anticipated. "Results for the quarter indicate the company must continue its efforts to reduce costs of operations and strengthen its position in the market."

Despite its financial problems, Equatorial has successfully added large customers to its two-way VSAT service. The list of users added in 1987 includes Fiserv, Inc., the U.S. Department of Agriculture's Forest Service and the Bureau of Land Management.

While Equatorial and AT&T are trying to make do, GTE Spacenet Corp. claimed it is not suffering from the same industry illnesses. GTE Spacenet President C. Jerry Waylan said the company has already signed contracts amounting to more than 3,000 VSAT stations.

Phil Arst, a satellite networking watcher with Saratoga, Calif.-based Communications Strategies Associates, Inc., and a former director of marketing for Equatorial, said VSAT vendors must shift their sales strategy. "The VSAT industry has shot itself in the foot by trying to sell on price, rather than selling the strategic business benefits of satellite networking," he said.

Bill Reed, director of electronic communications services for Link Resources, Inc., a New York-based communications research and consulting firm, said communications managers are more comfortable using terrestrial network services such as private lines than VSAT technology.

"Communications managers do not feel safe with VSATs because there aren't any users with VSAT nets that have been operational for a long period of time."

---

# Ex-GIs trade M-1s for T-1s

continued from page 1

Communications professionals in the armed forces get intensive training in a wide variety of sometimes esoteric communications technologies, and they are called upon to implement those technologies in unusual, often unique, applications.

Many communications workers in the military find themselves thrust into management roles long before their counterparts in the commercial sector. And they are often required to work in high-pressure situations, sometimes under the worst conditions.

"You'll never get me to knock the training I got in the military," DeCicco said.

"When I went to electronics school, it was for 36 weeks, six hours a day. There is no equivalent training on the outside," he added.

When DeCicco retired from the Navy in 1977, after 20 years of service, he was able to leverage his service contacts to land a civilian job as manager of data communications systems in the telecommunications department of Litton Industries, Inc., where he worked for five years before joining Bechtel.

"The director of communications for Litton was my operations officer when I was stationed in Hawaii," DeCicco said. "He knew me, and he knew I'd earn my money."

DeCicco served two tours of duty in Vietnam. In 1965, he was assigned to the Defense Communications Agency and sent to an air base near Saigon, South Vietnam. Working in circuit engineering, he designed voice and data networks supporting the U.S. military in Vietnam. "We were laying out the circuits in-country to support all of the branches of the service," he said.

In 1969, DeCicco returned to Vietnam. During his second tour, he was in the operations end of the military telecommunications network. "We were responsible for the day-to-day operation of the systems," he said. "We were responsible for restoring service when there were outages."

By this time, the U.S. military effort in Vietnam had escalated. "We traveled all over the country," he said. "We worked 12- or 14-hour days, 6½ days a week."

### Gaining responsibility

Mark Diemer also logged some long hours when he was with the Navy. "Along with all of the training and opportunity to learn came a lot of responsibility. I was on call 24 hours a day for a while," he added.

Diemer, now telecommunications network coordinator for the State University of New York, credits the Navy with giving him his initial supervisory experience. "I had 18 technicians working for me and an operating budget to worry about, plus all the paperwork and equipment," he said. "At the time, I was 23 years old. You just can't pay for that kind of experience."

He agreed with DeCicco that civilian telecommunications professionals with military experience are able to put their service contacts to good use.

When Diemer was working for Union Trust Co., a Connecticut bank, he hired Charles Helms, with whom he served in the National Guard, after the two men completed their active military duty. Helms served with the Air Force.

Diemer was overseeing the installation of a large digital telecommunications network for the bank, and he was familiar with Helms' work from their weekend guard drills.

"I'd put together the communications center at Stuart Airport, our guard unit," Helms said. "I'd done the installation work and gone through the troubleshooting. When Mark's project was coming down the line, he was looking for someone with a background similar to mine."

Diemer, who spent nearly seven years in the Navy after enlisting in 1978, praises the training he received in the service. Following boot camp, he served two six-month training stints at Navy technical schools, where he studied a number of communications media including microwave and encrypted voice transmission.

Because the Navy equipment ran the gamut from World War II-vintage radio and teletype gear to modern satellite communications equipment, Diemer said he learned to be flexible in applying technology.

The New York state native, who entered the service after spending three years at Siena College in Loudonville, N.Y., was newly married when he joined the Navy. "It was a conscious effort to find a career and to start a family," said Diemer, who finished work on his bachelor's degree in English after he was discharged from the Navy.

In 1982, when he was sent to a naval base on Guam, a key military communications installation, Diemer got his first experience with leading-edge telecommunications applications. "That was the first time I was exposed to T-1, he said. "The Navy was not necessarily state-of-the-art in equipment, but they were state-of-the-art in applications."

While stationed on Guam, he worked at a relay station that was one link connecting ships in the South Pacific to virtually any place in the world.

"That's when I started understanding that anything is possible as far as networks are concerned. When I got out of the Navy, I kept track of what was going on as T-1 became more flexible and more common in civilian applications."

Del Combs' 20 years in the Air Force included a stint in the office of the inspector general for the North Atlantic Treaty Organization (NATO). Combs, now director of communications and information systems at the University of Kentucky in Lexington, also received extensive training and experience in communications and electronics. He earned an MBA while in the Air Force.

Before he retired from the Air Force to pursue a communications career in the corporate world, he was chief of a unit that evaluated equipment contracts and purchases for the air traffic control and landing system unit at Scott Air Force Base in Illinois.

Combs said his experience working for NATO and his experience at Scott Air Force Base have been very helpful in his civilian dealings with equipment and service vendors. "I was familiar with policy, procedure, contracts and documents."

Combs, Helms and the other veterans are, for the most part, extremely positive in their recollections of military service. In retrospect, at least.

"Well, you never think you are getting promoted fast enough, and there are other complaints I could make," Helms said, "but I never would have gotten into this field if it weren't for the military."

## ITT sells WORLDCOM

continued from page 1

In 1986, ITT sold the bulk of its holdings to the French Cie. Generale d'Electricite for $1.3 billion. The company also sold its Dialcom, Inc. electronic mail subsidiary to British Telecommunications plc that year, and sales of other ITT communications holdings are pending (see graphic on page 1).

Western Union has suffered in recent years from the decline of its principal lines of business, including telex and money transfer, but has struggled to maintain telex operations and buoy revenue with new network services such as packet switching.

Under its agreement with LeBow, Western Union must complete a restructuring plan that was part of an earlier investor agreement with Pacific Asset Holdings and MDC Holdings, Inc., which will remain equity investors. Western Union will merge into subsidiary, Western Union Telegraph Corp.

LeBow will invest $25 million in exchange for Western Union junior stock, which will, upon completion of the restructuring, be converted into common stock, giving the investor 53% ownership and control over the telecommunications concern. LeBow said he will merge the two operations upon completion of the restructuring.

An ITT spokesman said the combined entities will offer networking services including leased lines, electronic mail, computer-to-computer communications, public packet switching and international telex. "WORLDCOM and Western Union are highly complementary," the spokesman said. "We operate in the same markets. They have strength domestically; we have a large international presence."

Despite the poor health of both communications concerns, "the big boys must think there are profitable businesses in Western Union or they wouldn't be fighting over this corpse," surmised Fulton Holmes, vice-president of utility research with New York-based Thomson McKinnon Securities.

Although it offered new services, Western Union sustained a loss of $460 million on revenue of $214 million last year. That loss was 35% greater than the $340 million loss reported the year earlier. Revenue declined 8% from a 1985 total of $231 million. ITT's WORLDCOM division has also operated at a loss.

Edward Gaylor, director of research with New York-based Pershing and Co., agreed that the companies cannot rely on telex for revenue generation as they did in the past. He said electronic mail will take its place. "Western Union should profit from its electronic mail operations. There's more potential in that business now than there ever was in telex."

The new Western Union could leverage its name and customer base to gain a toehold in the networking services market, analysts said. "Western Union belongs in the communications business," Gaylor said. "It remains to be seen whether it will dig out of its hole, but at least it's been given the shovel."

---

## COMSAT: The deal's off

continued from page 2

originally indicated.

According to a May 4 FCC statement, "The April 6 refund order is not a final determination that any such refund will be required. After COMSAT presents future arguments on the [earnings] question, the full commission will decide whether to require a refund of these monies."

The refund order was issued by the FCC's Common Carrier Bureau, not the full commission. It claimed that COMSAT had earned more than its allowable 12.5% rate of return.

The refund order was among several FCC actions that Contel said prompted it to cancel the merger. Contel claimed the $62 million refund would diminish COMSAT's value by 15%, making it a less attractive partner.

But analysts such as William Rahe, a vice-president with Stamford, Conn.-based Gartner Group, Inc., said the merger cancellation was the result of an internal power struggle between Lemasters and Contel founder and Chairman Charles Wohlstetter, who had begun to doubt the wisdom of the merger. Wohlstetter would have become chairman of COMSAT.

Wohlstetter and COMSAT Chairman Irving Goldstein met recently in New York to discuss the merger, but both companies said that no decision on the pact had been reached.

According to McGraw, COMSAT may seek a merger with another company. "COMSAT must continue to grow," he declared. "One of the ways of doing this is through an acquisition or merger with a company that meshes well with both our regulated INTELSAT business and our unregulated satellite business.

"We articulated a business strategy last year that included a merger," McGraw said.

"Because Contel has fallen out of bed doesn't mean our strategy is no longer viable," he added.

---

**Look what's coming . . .**
**Network World Direct Response Cards!**

**Now you can request communications / networking product and service information directly from vendors.**

You know as well as anyone that keeping up with all the new communications/networking products and services is not an easy task. You generally have to make numerous calls to vendors to get the information you need. But *Network World's* new service — Direct Response Cards — will make getting that information easier for you.

**Here's how you can put this new service to work for you:**

During June, September, and December you'll receive Direct Response Card Decks from *Network World*. All you need to do is flip through each deck, pull the cards of interest to you, and then request the information you need by completing and mailing the cards. And, since the cards are in business-reply format, the service requires nothing from you except a few minutes of your time. Oh, and don't forget to pass on your unused cards to business associates who might benefit from them as well.

*Network World* Direct Response Cards. They're your key to contacting leading communications/networking vendors and obtaining the valuable product and service information so crucial to your day-to-day operation.

Be sure to keep a look out for the first *Network World* Direct Response Card Deck — it's scheduled to arrive on your desk June 17.

Advertisers can reserve space in the June Direct Response Card Deck by contacting their local *Network World* sales representative or calling Joan Pinsky, Account Executive, toll free at 800-343-6474 (617-879-0700 in MA). Closing is May 20.

NETWORK WORLD
The Weekly for Leading Users of Communications Products and Services
A CWCI Publication
An International Data Group Company

**Boston:** (617) 879-0700 / **New York/Philadelphia:** (201) 967-1350 / **Washington, D.C.:** (301) 721-4763 / **San Francisco:** (415) 328-4618
**Atlanta:** (404) 394-7509 / **Chicago:** (312) 827-4433 / **Los Angeles:** (714) 250-3006

# CAREER ANNOUNCEMENTS

## Are you looking for...

Data Communications Managers?
Telecommunications Managers?
Telecommunications Engineers?
Network Managers?
Communications Networks Specialists?
Factory Communications Managers?
Systems Analysts?
Telecommunications Analysts?
Transmission Managers?
Data Communications Consultants?
Systems Engineering Managers?
Directors of Information Services?
Project Engineers/Network Development?
Telecommunications Software Programmers?
Systems Network Programmers?
Senior Datacommunications Specialists?
Telecommunications Network Planners?
Manager Voice Communications?
Senior Satellite Systems Engineers?
Project Leaders?
Group Datacommunications Sales Managers?

No matter who you want to recruit, *Network World* delivers your message to the right audience of communications professionals.

For details, call Classified Advertising Dept., toll free at
**800-343-6474** (**617-879-0700** in MA)

# COMMUNICATIONS MARKETPLACE

## AT&T Cellular Mobile Phones

***$699.00*** PLUS TAX

INCLUDES *FREE* STANDARD INSTALLATION IN MASS.

*** Delivered UPS anywhere in the U.S.**

*** Installed by local authorized installer.**

*** Full 2-year warranty.**

***Call Arista Communications Today!***
***(617) 875-4888***

** Foreign cars/sports cars may require additional charge.*

## TELECOMMUNICATION NETWORK DESIGN SPECIALISTS

Take a close look at Telenet, a US Sprint company. Our pace-setting technology makes us a fast-growing leader in data communications.

We already own and operate the world's largest Public Data Network, supporting over 1000 virtual private networks. And we lead in developing and installing dedicated networks that span the globe—with over 70 already in place. In all, Telenet's powerful networks respond to over half a million requests each day. And this is just the beginning.

If you're ready to excel in sophisticated network design, get to know us. We have immediate openings for the following:

### NETWORK DESIGN MANAGER

Your efforts will center on topological design and optimization of packet and circuit switched data networks, developing network expansion plans, traffic analysis, and routing methodologies.

To qualify, you'll need an advanced degree in Operations Research, Computer Science, or Electrical Engineering (or equivalent) and 2-4 years experience in telecommunication network design, T1 technology, packet and circuit switching, X.25, and network design tools.

### NETWORK DESIGN ANALYST

You will design and develop network design and planning analysis systems for Telenet's Public Data Network. Your responsibilities will include network modeling and optimization, statistical analysis of network accounting and traffic data, capacity planning analysis, and data base modeling.

An advanced degree in Operations Research, Engineering, or Statistics with solid skills in mathematical problem modeling, computer programming, and statistical analysis are required. Previous telecommunications or engineering experience is desirable.

In return for your ingenuity and initiative, we provide a competitive salary and complete benefits, including an on-site health club, company-paid insurance, educational assistance, a tax-deferred savings plan, and much more. If you've got what it takes send your resume and salary requirement in confidence to:

**Telenet Communications Corporation**
Attn: Jim Brown
12490 Sunrise Valley Drive
Reston, VA 22091

An equal opportunity employer. Principals only.

*Telenet*
*A US Sprint Company*

## Focus is on innovative users

continued from page 2

Three feature sessions and five so-called "Special Open" sessions are open to all conference attendees. About 60 technical sessions, which are divided into voice, data, office automation and management categories, are open only to representatives of ICA member companies. The ICA estimated that 2,000 of the 10,000 conference attendees will be ICA members.

Contrasting this year's conference with those of past years, the chairman of ICA's Technical Program Committee, Jerome Satkus, said technical instruction has been mildly de-emphasized in favor of industry perspective and concepts.

The ICA booked major names in the communications industry to speak at feature sessions. Ellen Hancock, an IBM vice-president and president of the Communications Products Division, will speak Thursday; Alfred Sikes, head of the U.S. Department of Commerce's National Telecommunications and Information Administration, will appear Monday; and Gideon Gartner and Dale Kutnick, of Gartner Group, Inc., are scheduled for Tuesday. Patricia Diaz Dennis, a Federal Communications Commission member, will speak at the Thursday Special Open session.

Satkus pointed to two sessions of particular importance to users: the "Integrated Services Digital Network — Update" technical session and the "Economic Status of the Telecommunications Industry." At the ISDN update, researchers from Bell Communications Research, Inc. will outline ISDN fundamentals and discuss the results of ISDN field trials.

Satkus said the "Economic Status" session will give users insight into "how well companies are doing; which ones are going to survive and which ones aren't going to survive," adding that it will help users to identify where they should put their money. Session speaker Maria Sbrilli of Smith Barney, Harris Upham & Co., Inc., will present an analysis of the effects of equal access and deregulation on telecommunications vendors.

Robert Craig, vice-president for network planning at Chase Manhattan Bank, N.A. and another show speaker, said he will give users ideas for turning communications into a profit center rather than a service function. "The best engineered and operated private networks may be doomed for failure unless managers address them in a business sense," he said.

Technical instruction has been mildly de-emphasized in favor of industry perspective and concepts this year.

Craig cited deregulation and the impact of new technologies as primary user concerns this year. Craig, who will chair a session entitled, "Managing a Private Network," said he foresees a shakeout in telecommunications, saying, "Too many vendors are offering too many products in too many fields; people are stepping on each other to gain market share."

Gary Anderson, speaker at the "Selection, Installation and Management of T-1 Facilities" session and manager of telecommunications planning at Hughes Aircraft Co., said network management is a crucial topic for all network managers. "Network management is probably the key to knowing what we want to do and how we want to do it," he said, "because we can only be as efficient and effective as the information we can access in a timely fashion."

Not surprisingly, several sessions will focus on network management, including "Next Generation of Network Management Systems," "Monitoring Data Network Performance" and "Management Capabilities of Smart PBXs."

Several associations and users groups are slated to hold meetings concurrently with the ICA exhibition. The National Rolm Users Group will meet May 19. Rolm Corp.'s new president, Ray Abu-Zayyad, is expected to address the users. The Society of Telecommunications Consultants will hold an IBM focus discussion on May 15, followed by a three-day meeting. ◻

## 3Com airs EtherTalk

continued from page 2

sion. The only difference will be that each type of microcomputer will run its own station software. Sidhu said that the EtherTalk card, which Apple will also make available later this year for $899, will pave the way for third-party vendors to build bridges and gateways to other networks based on Ethernet. "It could be plugged into anyone's Ethernet, but the software needs to be there to allow the Macintosh to talk to other machines on the network."

Raffel pointed out that, once 3Com's unshielded twisted-pair wiring scheme becomes available, Macintosh IIs with EtherTalk will also be able to operate at 10M bit/sec over this wiring. "The same transceiver technology was also built into EtherTalk," he said. ◻

# CALENDAR

**May 17-22, New Orleans — ICA Conference and Exposition.** Contact: International Communications Association, P.O. Box 910404, Dallas, Texas 75391.

**May 18, Washington, D.C. — Telecommunications for Architects.** Contact: HCI, Suite 210, Centennial Park Drive, Reston, Va. 22091.

**May 18-19, Atlanta — SNA.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

**May 18-21, Washington, D.C. — DTS.** Contact: Continuing Engineering Education, The George Washington University, Washington, D.C. 20052.

**May 18-21, Washington, D.C. — Experts on Networks.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

**May 19-20, Washington, D.C. — The Huber Report Verdict.** Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

**May 19-21, Boston — Amy D. Wohl 2nd Annual Office Systems and Networks Dialogue.** Contact: Wohl Associates, 555 E. City Line Ave., Bala Cynwyd, Pa. 19004.

**May 21-22, Birmingham, Ala. — Fourth Annual System/34, System/36, System/38 User's Group Seminar.** Contact: System/34/36/38 User's Group, P.O. Box 11484, Birmingham, Ala. 35202.

**May 27-29, Thousand Oaks, Calif. — Hands-On SNA: A Complete Examination of IBM Protocols through Experimentation.** Also, June 1-3, Washington, D.C.; June 10-12, Boston; June 17-19, Chicago. Contact: American Institute, 55 Main St., Madison, N.J. 07940.

**June 1-3, Madison, Wis. — TechniCON '87: A Symposium on Advancements in Telecommunications Technologies.** Contact: Parker Communications Corp., Suite 205, 2801 International Lane, Madison, Wis. 53704.

**June 1-3, Boston — Data Communications: Basic Concepts.** Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

**June 2-3, Washington, D.C — The Fourth Annual Bypass and Local Exchange Competition.** Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

**June 2-4, Ann Arbor, Mich. — Real Time Factory Control.** Contact: Society of Manufacturing Engineers, Special Programs Division, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Network World Sales Offices

BOSTON
**Donna Pomponi**
375 Cochituate Rd., Box 9171
Framingham, MA 01701-9171
(617) 879-0700

NEW YORK
**Paul Bonington**
**Joan Daly, Regional Manager**
Paramus Plaza 1, 140 Route, 17 North
Paramus, NJ 07652
(201) 967-1350

NEW JERSEY/PHILADELPHIA
**Joan Daly, Regional Manager**
Paramus Plaza 1, 140 Route, 17 North
Paramus, NJ 07652
(201) 967-1350

WASHINGTON, D.C.
**Bill Burke**
**Joan Daly, Regional Manager**
2133 Defense Highway, Suite 205
Crofton, MD 21114
(301) 721-4763

SAN FRANCISCO
**Chris Clyne, Regional Manager**
3350 West Bayshore Rd., Suite 201
Palo Alto, CA 94303
(415) 328-4618

ATLANTA
**Tom Tolbert**
1400 Lake Hearn Dr., Suite 330
Atlanta, GA 30319
(404) 394-7509

CHICAGO
**Fran Jonikaitis**
2600 South River Rd., Suite 304
Des Plaines, IL 60018
(312) 827-4433

LOS ANGELES
**David Pronenko**
**Chris Clyne, Regional Manager**
18004 Sky Park Cir., Suite 100
Irvine, CA 92714
(714) 250-3006

CLASSIFIED ADVERTISING
**Joan Bayon Pinsky**
375 Cochituate Rd., Box 9171
Framingham, MA 01701-9171
(617) 879-0700

Network World Headquarters
375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171, Phone: 617 879-0700, Telex: 95-1153, FAX: 617 875-8931

Ron Mastro
**National Sales Director**

Pam Valentinas
**Manager/Marketing & Sales Operations**

Karen Wallace
**Account Coordinator**

PRODUCTION **Production Director,** Peter Holm, **Senior Production Manager,** Leigh Swearingen, **Production Assistant,** Christopher P. Cuoco
CIRCULATION **Corporate Distribution Manager,** Robert W. Wescott, **Circulation Manager,** Richard Priante

*Network World* is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 80 computer publications in more than 28 major countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S *Computerworld Argentina, PC Mundo;* ASIA'S *Communications World, Computerworld Hong Kong, Computerworld Indonesia, Computerworld Malaysia, Computerworld Singapore, Computerworld Southeast Asia, PC Review;* AUSTRALIA'S *Computerworld Australia, Communications World, Australian PC World, Australian Macworld;* AUSTRIA'S *Computerwelt Oesterreich;* BRAZIL'S *DataNews, PC Mundo, Micro Mundo;* CHILE'S *Informatica, Computacion Personal;* DENMARK'S *Computerworld Danmark, PC World Danmark;* FINLAND'S *Mikro, Tietoviikko;* FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Le Monde Des Telecoms;* GREECE'S *Micro and Computer Age;* HUNGARY'S *Computerworld SZT, Mikrovitag;* INDIA'S *Dataquest;* ISRAEL'S *People & Computers Weekly, People & Computers Biweekly;* ITALY'S *Computerworld Italia;* JAPAN'S *Computerworld Japan;* MEXICO'S *Computerworld Mexico;* THE NETHERLANDS' *Computerworld Netherlands, PC World Benelux;* NEW ZEALAND'S *Computerworld New Zealand;* NORWAY'S *Computerworld Norge, PC World Norge;* PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld, China Computerworld Monthly;* SAUDI ARABIA'S *Arabian Computer News;* SOUTH KOREA'S *Computerworld Korea, PC World Korea;* SPAIN'S *Computerworld Espana, Commodore World, PC World Espana, Communicaciones World, Informatica Industria;* SWEDEN'S *ComputerSweden, Mikrodatorn, Svenska PC World;* SWITZERLAND'S Computerworld Schweiz; UNITED KINGDOM'S *Computer News, DEC Today, ICL Today, PC Business World;* UNITED STATE'S *Amiga World, Boston ComputerNews, CD-ROM Review, Computerworld, Computers In Science, Digital News, Federal Computer Week, 80 Micro, FOCUS Publications, InCider, Infoworld, Macworld, Computer + Software News (Micro Marketworld/Lebhar-Friedman), Network World, PC World, Portable Computer Review, Publish! PC Resource, Run;* VENEZUELA'S *Computerworld Venezuela;* WEST GERMANY'S *Computerwoche, PC Welt, Run, Information Management, PC Woche.*

▶ *PRODUCT REVIEW*

# Analyzing LAN analyzers

**BY JOHN J. HUNTER**
Contributing Writer

Many companies using Ethernet local-area networks are finding that managing them can be a tricky business. Network managers need to know: What are the network loads at any particular time? What channels are the most active? What types of errors are occurring? And, what will happen to the network when more terminals are added? Two California companies, Excelan, Inc. of San Jose, Calif., and Hewlett-Packard Co. of Palo Alto, Calif., think they have all the answers.

They have some of them. The Excelan LANanalyzer and HP's HP 4971S provide good network performance statistics, and they can be used to run tests on individual stations and review the results.

Both can analyze high-level protocols such as Transmission Control Protocol/Internet Protocol and Xerox Network Systems. However, neither is a sophisticated piece of test equipment or a network manager; they cannot simulate a terminal to perform extensive testing, nor is it possible to remove faulty products from the network with either analyzer.

Both products interface with the local-area network backbone and provide menus that permit the operator to establish test parameters, take measurements and evaluate the results. With the HP 4971S, users receive help screens and on-line portions of the user's manual. Excelan relies on the user to read and remember the procedures outlined in the user's guide.

**Packaging**

Of the two manufacturers, Excelan has taken the more intelligent approach toward packaging. Buyers of the Excelan LANanalyzer can choose from two alternatives. The first is a controller board that fits into a full expansion slot in an IBM Personal Computer, XT, AT or compatible with at least MS-DOS 2.0 and 512K bytes of random-access memory.

The second is a packaged system consisting of a Compaq Computer Corp. Portable 286 personal computer with 640K bytes of RAM, 20M-byte hard disk and the controller board installed. Local network control software for both versions is loaded from diskette.

There are no operational differences between these two systems; the only variances are portability and price. Be prepared to shell out about $20,000 for the packaged unit, vs. $10,095 for the board-level version with all of the options. Of course, there is nothing to stop you from buying your own computer and making your own portable tester for a lot less money.

The HP 4971S is offered only as a packaged unit, slightly larger than an IBM Personal Computer AT. The 4971S costs approximately $27,500 for a unit with a communications facility, statistical package and a 10M-byte hard disk. In addition, the HP unit works only as an analyzer, while the Excelan LANanalyzer can function as an Ethernet node or stand-alone personal computer when not being employed for network analysis.

Both analyzers provide virtually the same types of tests and furnish the same levels of information. For example, operators of either unit can name the channels or individual terminals to be tested and the types of errors to be sensed and collected. Users can also specify their own specific bit-pattern triggers.

The two also allow the user to set limits on the size of the packets to be captured. This eliminates clogging the capture buffer with very small packets caused by collisions. Excelan puts no limits on packet size, while HP filters packets less than 512 bits. HP's rationale for this limit, according to its literature, is that in heavily loaded networks, when short packets are received with a minimum interframe spacing, many local network interfaces can miss the packets. Perhaps, but the user might prefer to have the option of specifying what gets filtered.

## Features and functions of two LAN analysis systems

| | Vendor/Product | |
|---|---|---|
| | Excelan, Inc.<br>San Jose, Calif./<br>LANanalyzer | Hewlett-Packard Co.<br>Palo Alto, Calif./<br>HP 4971S |
| Portable | ✓ | |
| PC-compatible | ✓ | |
| Nodes monitored concurrently | 200 | 1,000 |
| Price range | $9,500 to $20,485 | $21,826 to $28,400 |

SOURCE: TMS CORP., DEVON, PA.

The LANanalyzer and HP 4971S use dual-ported 1M-byte circular capture buffers to hold captured packets. HP users can limit the volume of data stored by specifying any of 16 different channel filters to be matched against incoming packets. Each filter can be 61 bytes long. Excelan permits eight channel filters, with up to 16 nodes monitored concurrently; three nodes can be grouped on each channel. Each LANanalyzer filter can be 128 bytes long. HP can monitor five times as many concurrent nodes as Excelan — 1,000 vs. 200.

Both units employ chained buffers for handling captured packets. HP sets its buffer boundaries at 480 bytes, while Excelan uses a 256-byte boundary. Excelan claims that 2,700 256-byte packets and 450 1,518-byte packets can be held in its unit. HP could not quote an exact number.

Users of both analyzers can specify the start and stop times for tests and the number of packets to be stored in the capture buffer. They also have the option of storing and recalling either entire packets or portions called slices on hard disk or floppy.

The two products also allow data to be simultaneously displayed in hexadecimal or ASCII. The displayed information indicates the source and destination address for each packet, the length of the packets, the type of errors detected and the time the packet was received. Excelan time-stamps packets within 10 microsec; HP takes 32 microsec. Both units allow the operator to scroll through the entire buffer or go to selected source and destination addresses within the buffer or to the packets on disk.

**Network management**

The network management capabilities of both testers are restricted to measuring the traffic loading on each channel, and both allow users to inject packets into the local network data stream to judge how well the system reacts to increased traffic.

While both analyzers enable users to view traffic-level loading in real time, the LANanalyzer employs a single-screen display showing channel loading (as a bar graph), the percentage of errors occurring by error type, the number of packets transmitted with and without errors, a count of individual error types occurring on each channel and the number of complete packets received. An HP sales representative stated that the 4971S has the same single-screen capability, but this is not indicated in company literature.

The HP 4971S outshines the LANanalyzer in the area of network development. The 4971S provides a matrix display that shows the source and destination addresses of 31 user-selected channels and the volume of packets sent by one address to another. This permits the user to assess interchannel traffic distribution in real time.

The HP 4971S also provides a bar graph showing burst traffic periods measured according to interframe-spacing time. This allows network planners to view traffic patterns in real time. The 4971S checks network response time to determine message-transmission time, as well. The display shows absolute time, acquisition time in microsec, the percentage of deferred requests, collisions and percentage of aborted attempts.

Both products present bar charts to show network loading during specific periods, but the LANanalyzer display contains more useful information. For example, the data shows the average packet size gathered over a specific test period and presents the information as a percentage of bits in each packet. If 98% of the packets had 64 bytes, that indication is displayed along with peak traffic rates. The performance statistics also show the number and types of errors occurring during the measurement period. Users can obtain this same information on the HP 4971S, but the data is displayed on different screens.

In addition to analyzing on-premises local-area networks, both products can be used to control measurements at remote locations. LANanalyzer customers can use software packages such as Meridian Technology Corp.'s Carbon Copy to control the remote site. HP 4971S users employ a separate personal computer to control the remote unit, but they must develop their own remote control software. HP says it will furnish instructions for writing the program free of charge.

Both products do a good job of measuring traffic, provided volume stays below 40% of network capacity. Above that, both will lose packets. Excelan claims its problem stems from the software running with the 80186 processor on its packet-collection card, and it says that the problem will be fixed shortly. HP states that packets will be lost when users select special applications, such as setting traps for specific bit patterns. Since setting data traps is a common fault-analysis application, losing packets is quite a drawback.

In summary, while both units provide approximately equal facilities for monitoring and measuring Ethernet local network performance, the Excelan LANanalyzer is the machine of preference. Its screens incorporate more related performance statistics; customers have the option of using lower cost hardware, and the unit can be employed as a network node when not being used for analysis.

On the plus side for the HP 4971S, it is more user-friendly, and it does furnish network development tools unavailable with the LANanalyzer. Whether that justifies its singular packaging, lack of portability and higher price is another matter. ◻

*Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.*

# Now, the best 19.2 modem, backed by the best service, brings you the best results.

# Guaranteed!

PARADYNE'S 3400 SERIES HIGH-SPEED MODEMS

Paradyne combines the most advanced modem features and service offerings to bring you the best results...unprecedented performance and Guaranteed Network Availability.

ADVANCED TECHNOLOGY FOR EFFICIENCY

The new 3400 Series of high-speed modems incorporate Paradyne's field-proven custom VLSI design with a new digital signal processing architecture. This revolutionary Universal Signal Processor provides the highest online performance available.

NETWORK CONTROL FOR RELIABILITY

The deluxe diagnostic front panel allows operators to configure, monitor and test local and remote modems while the unique AUTO-SCAN feature continously monitors hardware and line conditions. The 3400 Series are also fully compatible with Paradyne's ANALYSIS network management system.

APPLICATION FLEXIBILITY

The wide array of standard features include a 2-channel multiplexer, Auto-Call Auto-Answer dial restoral and expansion slots for future options and custom applications. Options include 8-channel statistical or time-division multiplexers.

GUARANTEED NETWORK AVAILABILITY

Paradyne's Guaranteed Network Availability and Service Response program provides for 99.5 percent network availability, or we'll credit your account.

So get the industry's best high-speed modem and let Paradyne guarantee the results.

For details, call 1-800-482-3333. In Florida, call 1-800-342-1140.

**paradyne**

*Nothing is quite as good as the best*